THE COMPANION DOCUMENT TO THE HOSPITAL WASTE AUDIT MANUAL

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Report Prepared For:

Waste Management Branch
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THE COMPANION DOCUMENT

TO THE

HOSPITAL WASTE AUDIT MANUAL:

THE FIRST STEP TOWARD WASTE REDUCTION,

REUSE AND RECYCLING

Report Prepared By:

ORTECH International

Report Prepared For:

Ottawa General Hospital
in conjunction with
Environment Canada
and
The Ontario Ministry of the Environment

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FOREWARD

Hospitals, like other industrial, commercial and institutional organizations, are under great pressure in the 1990s to reduce the amount of waste they are sending for disposal. In order to achieve their desired reduction, hospitals need to understand what waste they are generating and what opportunities exist for them to reduce this waste or divert what is generated from disposal by reuse or recycling.

A hospital is a very complex institution. A large teaching hospital can produce as much waste as a small town. Auditing the generation of waste is also a complex task, if meaningful information is to be generated.

This document has been produced to help hospitals to conduct a comprehensive audit of wastes generated and to look for opportunities to reduce the quantities of waste going to disposal through practical cost effective waste reduction, reuse and recycle practices.

The document has been produced, based on ORTECH's experience in conducting a comprehensive waste audit at Ottawa General Hospital (OGH) in the fall of 1990. Data from this audit are presented as an Appendix to this document. These data are presented in a format that allows for use of the data to make predictions of waste generation rates at other hospitals. This is described in Section 6. To use the data, it is important to understand any differences between the hospital being considered and OGH. A brief description of OGH, with particular emphasis on factors influencing waste generation, is included in Section 5.

The heart of the document, which describes how to conduct a detailed waste audit, is presented in Sections 7 and 8. This is followed by Sections 9 and 10, which explore opportunities for waste minimization and implementation of those opportunities.

Appendices to the document include the detailed OGH data, and a list of sources of further help.

The document has been written with a view to it being a practical "how to" document, rather than a scientific treatise. It is produced for hospital staff who have the responsibility for waste reduction in their particular institution, e.g. Materiel Management, Engineering, Occupational Health, Purchasing, or Environmental Management. It would also be useful for consultants who might be helping the hospitals to understand their waste generation, and for government staff, who want to assess the completeness of waste audits and reduction plans undertaken by hospitals.

The document can be used in one of two ways, or even as a combination of both.

1. Using the data from the OGH audit and the information as described in Section 6, an estimation approach for calculating waste generation can be used.

2. Using the outline in Section 7, a complete comprehensive audit can be conducted from scratch.

3. The estimation approach can be used for parts of the hospital similar to OGH, and a detailed audit can be conducted for dissimilar parts.

This Companion Document may be used as a reference for those hospital representatives who may be using the Generic Waste Audit Manual. The Hospital Waste Audit Manual is available to help the waste auditor conduct an audit using the estimation approach and provides a step by step procedure.

1. INTRODUCTION

Hospitals, by the very nature of their activity, generate various types of both hazardous (i.e. biomedical, chemical, radiological) and non-hazardous wastes. Previous studies have shown that the majority of wastes arising from hospitals are non-hazardous, and similar to those wastes which are generated at the household level, as seen in the following table[1]:

Waste Type	Daily Quantity kg/bed/day	% of Total
Biomedical		
Human Anatomical	0.05	0.8
Infectious, non-anatomical	0.27	4.9
General Wastes		
Kitchen	0.86	15.8
General	4.07	74.4
Other	0.23	4.2
	5.5	100.0

The quantities of these various waste types depend on several factors, including:

1. The range of services offered at the facility
2. The size of the facility
3. Purchasing policies with regard to proportions of single use items and durable items[2].

The average quantity of waste generated in hospitals has traditionally been reported as weight of waste generated per patient bed per day.

The quantity of waste has been found, in the literature, to range from 2 to 7 kg/bed/day[2,3], with an average of 5-6 kg/bed/day in Ontario[1].

In an attempt to address Canada's growing waste disposal problems, various governments, businesses and associations have called for waste minimization programs. Waste diversion goals of 25% by 1992, and 50% by the year 2000 have been adopted by the federal and many provincial governments.

Federal initiatives include those measures that will be introduced with the Green Plan to protect our natural environment, and a strategy that will reduce the amounts of packaging wastes by 50% (by weight), from that currently disposed, by the year 2000, with 50% of that by source reduction and 50% by recycling.

At the provincial level across Canada, the Environment Ministries are considering how best to encourage waste reduction in the Industrial Commercial and Institutional (ICI) sectors. Options that are being considered by the provinces include mandatory source segregation for recycling, and mandatory waste reduction plans. For hospitals in Ontario, this will mean that recyclable materials, such as newsprint, aluminum, steel and glass containers will have to be source separated and sent for recycling. In addition, other initiatives, such as the Municipal Industrial Strategy for Abatement (MISA) will require a more controlled approach to managing discharges of various chemicals into the sewer system. Also, in many provinces, there will be new restrictions placed on the use of incinerators, and hospitals that currently incinerate the bulk of their general wastes will no longer be able to do so.

Many municipalities are also taking steps to reduce the amounts and types of wastes that can be disposed to landfill and to the sewer systems. Regulations are currently in place in some areas that ban certain types of material received for disposal at landfills, or where disposal of these materials may mean the payment of levies at the landfill site. These items may include materials such as; old corrugated cardboard, wood

wastes, tires, drywall from construction sites, and fine paper. The Model Sewer Use Bylaw, which will control the release of materials to the sewer system and/or prohibit the discharge of many materials that are currently sewered, is also being adopted by municipalities across Ontario.

It can be seen, therefore, that hospitals, as members of the business community, have a leadership role to play in environmental protection and waste minimization for several reasons:

(1) protection of the environment;
(2) compliance with relation to waste minimization goals set by federal, provincial and municipal governments;
(3) reduction of disposal costs;
(4) reduction of liabilities;
(5) reduction of costs of raw materials
(6) establishment of community examples which people follow. Health care professionals are traditionally well respected in the community.

It is with these goals in mind that the waste audit and reduction program should be carried out. Waste audits will help hospitals to better understand the types and quantities of wastes, and how and where these wastes are generated.

This document attempts to provide Canadian hospitals with the tools they need to minimize their waste streams, through developing a better understanding of the types and quantities generated. It is presented in a step-by-step format to lead the reader through the waste identification stages, starting with the identification of current waste generation rates, including how to conduct a detailed waste audit, waste generating areas and identification of possible waste minimization initiatives. However, it is the first step required in the development of cost effective waste reduction, reuse and recycling programs.

Before using this document, it will be important that you are familiar with federal guidelines and provincial regulation on the handling and disposal of wastes originating from a hospital. Helpful documents include these references:

(1) Guidelines for the Management of Biomedical Wastes in Canada - Report for the Canadian Council of Ministers of the Environment (CCME). (June, 1991).

(2) Canadian Hospital Association Environment Policy.

(3) Provincial Regulations on the disposal of Biomedical and other Hazardous Wastes.

(4) Provincial Hospital Association Environmental Policies (if available).

Further sources can be found in the Reference Section.

2. WHAT IS A WASTE AUDIT?

A waste audit is a detailed assessment of the quantities and types of waste materials generated by a facility. It relates the generation of waste to the activities in various sections. It then assesses the possibility of diverting waste from disposal using practical cost effective waste reduction, reuse and recycling approaches. It can also be used to define the scope and magnitude of the overall waste management program needed in a facility and specific needs.

It is important to understand the generation of waste, both quantity and type, from each area of an institution. Consideration of waste reduction or reuse must be undertaken with respect to specific activities that could be changed to effect reduction or reuse. For waste recycle to be most effective, segregation of recyclables from non-recyclables should be at the point of initial waste generation. By the time a waste has reached the disposal hopper or compactor, it is too late to consider waste reduction, reuse or recycle options.

For hospitals, as in most facilities, the generation of waste can be traced to various incoming sources. For health care facilities, these incoming sources include the following:

- material purchased by the hospital; durables, single use materials and the associated packaging;
- materials brought in with patients (e.g. anatomical wastes);
- materials brought in by staff and visitors (e.g. flowers, magazines);
- sample materials for laboratory processing (e.g. blood samples)

A large component of wastes from these incoming sources is material packaging. This component has good potential for reduction, reuse or recycling, if the appropriate principles are applied.

It is also important to relate waste generation to activity levels in the various areas, so that future waste generation rates can be predicted, based on changes in activity levels. For each area, an activity factor is chosen, e.g. for labs, it might be number of samples analyzed; for patient care, it might be number of beds occupied. Waste generation is then related to this factor, e.g. kg of waste/sample processed, or kg of waste per year per bed occupied, respectively.

What is described above is a "detailed comprehensive audit". Because of the complexity of the hospital, this level of detail is required in order to really understand what opportunities exist for reduction, reuse and recycling.

There are three other levels of waste audits that can be considered:

- an estimation approach
- cursory audits
- an estimation through the use of purchasing data

Estimation Approaches: rely on applying activity factors to given waste generation data and predicting the waste quantities generated. With the data presented in this manual, i.e. waste generation data per activity factor, this is now a possible approach for hospitals. This approach is described in Section 6.

Cursory Audits: are little more than examining weigh scale records from the waste disposal company and doing a half-day walk-through of a facility to identify major waste types qualitatively. The variability of activities and volumes of waste generated in large hospitals make this type of audit inappropriate. Smaller health care facilities, however, may find this approach useful, using this document as a guide and reviewing purchasing information.

Estimation of Waste Quantity by Evaluating Purchasing Information, A Future Approach: Another method of conducting analyses of disposed waste materials would be to only evaluate purchasing information, determine which items are non-durable and to fully define the material makeup (i.e. type of plastic, paper, metal), contaminants present, and the weight of the used materials. This type of analysis of purchasing information could be compared to disposal records and a material balance of materials coming in and waste going out could be prepared. Because hospitals are largely consumers of non-durable goods, this type of approach would be ideal <u>If</u> all of the other information stated was readily available. Unfortunately, at this time, waste auditing an entire facility by using purchasing records is not possible. However, with the greater restriction on solid and liquid waste disposal, this type of waste material management approach may be the norm in the future. At the present time, a combination of waste material analysis and use of purchasing information to confirm some estimates is a realistic approach.

3. GETTING ORGANIZED

3.1 Obtaining Senior Management Commitment

A key need for any waste audit is for approval by senior management of the activity, plus a commitment by them that they will seriously consider acting on recommendations resulting from the audit. Without this senior management backing, it will be much more difficult for the waste audit team to get co-operation from other members of the hospital staff. In addition, if senior management are not committed to the project, it may be very frustrating to try to implement practical waste reduction opportunities which are identified as being attractive.

3.2 Organizing an Environmental Committee

The next step is to form a committee representing all key activities in the hospital (i.e. nursing, housekeeping, infection control, materials management, purchasing, etc.). This should include, but certainly not be restricted to, senior managers. This 'Environment' Committee will be the key in communicating issues and concerns to, and requests for information from, the waste audit team.

The Environment Committee is also important in setting the stage at the hospital for promotion of overall environmental awareness in the hospital. In many municipalities, where "blue box" programs exist, staff who recycle at home may be more inclined to participate in waste minimization programs at work, should these be readily available. It would also be good practice to advertise the good things that the hospital has already accomplished in terms of waste minimization. This committee could report these facts to the staff through regular hospital newsletters and act as a body to receive suggestions from staff.

The committee will also determine who will do the audit. They should consider in-house resources to determine whether the audit can be

carried out by in-house staff. If this is not possible, there are other routes that the hospital may take. These include:

(1) Redesignating some hospital staff persons' duties
(2) Hiring contract staff
(3) Hiring an On-site worker (see Help Section) or getting assistance through other government employment programs with representation in your community
(4) Developing some creative ways to get help, e.g. involve local colleges or university students as a learning experience
(5) Hiring a consultant

If the work is being done by contract, the committee should develop a Request for Proposals or Terms of Reference for work to be carried out. The committee should then review proposals and make the selection of a contractor to undertake the waste audit. Check with your local municipalities or Ministry of the Environment to see if funding is available for this type of project.

Having identified the waste audit as a project, one contact person should be designated to facilitate the work of the audit team. This is particularly important if a contract person or consultant is being used to carry out the audit. The contact person will operate as a focal point to facilitate getting things done, appointments set up, etc. It should be someone who knows the hospital well, can help to make things happen, and help with any problems that arise during the audit.

4. UNDERSTANDING THE MAJOR WASTE CATEGORIES TO BE AUDITED

In this section of the manual, we define the major categories of waste that were audited at O.G.H. and should be audited by other hospitals. It should be noted that these definitions were written in February, 1991, with the regulations defining biomedical and sewerable wastes as they were then defined. Changes are expected in these definitions over the next few years as the federal and provincial governments agree on new definitions for biomedical waste, and municipalities across Canada review and tighten their sewer use by-laws. Brief descriptions of the wastes are given. For a full understanding of the wastes in question, refer to the references given.

The 6 categories of waste which should be audited are:

- Clean General Waste
- Confidential Paper Waste
- Biomedical Waste
- Chemical and Liquid Waste
- Radioactive Waste
- Pharmaceutical Waste

These wastes are separately categorized because they are handled and disposed of as unique materials. These categories are described in the sections that follow.

Many hospitals have developed waste management manuals that outline specific information on how wastes are handled in individual facilities. This document, when available, should be used as a guide to understand the handling, storage and disposal requirements at your facility.

4.1 Clean General Waste

4.1.1 Description

Clean general waste is considered to be all that waste generated in a hospital that is not of the 5 other categories of waste defined in the later sections. It includes office wastes, food waste, hospital maintenance wastes, out of date equipment, landscaping waste, as well as many wastes originating from patient care procedures, such as diapers and IV bags and disposable trays. Much of the waste is similar to what is disposed of as municipal or household wastes.

4.1.2 Waste Handling

Clean General Wastes are collected throughout the hospital in green garbage bags and delivered to a compactor or bin for disposal. There may be separate collections of materials such as food waste and cardboard.

4.1.3 Waste Disposal

Although there are no provincial or federal restrictions to date on the disposal of such solid wastes to sanitary landfill sites, many municipalities have issued their own disposal bans on various types of materials that are considered to be easily recyclable. Materials that may be banned include old corrugated cardboard, wood waste, drywall from new construction, fine paper, etc. Local municipal or regional public works departments provide information on what restrictions have been imposed on waste disposal. Ontario is one province that may soon legislate the segregation and recycling of additional items such as newspaper, aluminum, steel and glass containers[4].

Clean general wastes can be removed from a hospital using a solid non-hazardous waste management company. In some cases, hospitals may choose to have their own waste disposal arrangements to potentially

save money. Clean general waste can go to landfill, incineration or be sent off-site for recycling or reuse.

4.1.4 Obtaining Information About Waste Disposal

Contact the waste hauler and waste materials' recyclers who may be removing waste from the facility to determine quantities disposed of or recycled. Contracts and billing information may also be available from the purchasing departments at the hospital.

4.2 Confidential Paper Waste

4.2.1 Description

Hospitals generate many forms containing confidential patient and employee information. It is collected throughout the hospital from clinics, administration and laboratories. This type of paper could be carbon copy forms, non carbon paper (NCR) or computer paper.

4.2.2 Waste Handling

These forms are generally stored on-site and may be collected for regular shredding on-site or collected several times a year to be shredded by a mobile shredding operation.

4.2.3 Waste Disposal

After shredding, this paper could be disposed at landfill sites or recycled either using an on-site collection facility or the shredding firm. Some hospitals with on-site incinerators may burn this material although in Ontario, as in many other provinces, burning of general refuse in hospital incinerators will likely be disallowed soon.

4.2.4 Obtaining Information about Waste Disposal

Contact the shredding contractor to determine wastepaper quantities shredded and whether the waste is disposed of or recycled. Quantities of shredded material via an outside shredder could be obtained by contacting the persons responsible.

4.3 Biomedical Waste

4.3.1 Description

Biomedical wastes are those waste materials generated by health care facilities, medical research, teaching establishments and clinical testing laboratories which include anatomical and non-anatomical infectious wastes. In Ontario, these wastes are commonly referred to as pathological waste and disposal is regulated by the Ontario Ministry of the Environment (OMOE) under the Environmental Protection Act, Regulation 309[5]. Under the regulation, pathological waste is by definition a hazardous waste and is specifically defined in the regulation as:

(1) Any part of the human body, including tissues and bodily fluids but excluding extracted teeth, hair, nail clippings and the like that are not infectious.

(2) Any part of the carcass of an animal infected with a communicable disease or suspected by a licenced veterinary practitioner to be infected with communicable disease.

(3) Non-anatomical wastes infected with communicable disease.

Non-anatomical wastes can be further defined as:

(1) Microbiology laboratory wastes (i.e. laboratory culture, stocks, specimens, live or attenuated vaccines, human or animal cells

cultures used in research and laboratory material that has come into contact with the above).

(2) Blood and body fluid wastes (i.e. fluid blood and blood products).

(3) Waste sharps (i.e. from clinical or laboratory procedures consisting of needles, syringes, blades or laboratory glass capable of causing cuts of punctures.

Further definitions are offered in the document titled the Guidelines for the Management of Biomedical Waste in Canada[6]. This document is a combined provincial/federal effort to standardize the definition and handling of biomedical wastes in Canada. It is expected that these guidelines will be adopted by provincial authorities and augmented by the provinces as deemed necessary. In Ontario, further guidance can be found in the 1986 OMOE document, "Guidelines for Handling and Disposal of Biomedical Wastes from Health Care Facilities and Laboratories"[7]. In this document, communicable diseases are defined as the items contained in schedules of the Ontario Health Protection and Promotion Act, 1983, and the Canada Animal Disease Protection Act. Further clarification in the identification of infectious wastes is left up to health care professionals (i.e. infection control specialists or committee at the individual facility) to determine which wastes should be handled as infectious wastes. These wastes are generated in patient care areas, patient service and clinic areas and laboratories. Very small quantities would be generated in support service areas, if at all.

The other category of waste which is often handled as pathological waste is cytotoxic or chemotherapy waste. These wastes will be discussed in Section 4.6 with pharmaceutical wastes.

Other waste materials which are technically not biomedical wastes but end up being disposed as such because they may have been contaminated include gloves, packaging, plastic containers, glassware, etc. These other waste materials often make up the major portion of this

waste category. Segregation of non-contaminated wastes from biomedical wastes should be encouraged to reduce the cost of disposal.

4.3.2 Waste Handling

Waste handling procedures for biomedical wastes in a health care facility should be defined in the hospital waste management policy. Normally, these wastes are placed into colour coded bags for easy identification.

Environmental authorities strongly recommend the following colour coding scheme for containers and packaging:

Waste Type	Colour Coding
Human Anatomical	Red (or appropriate labelling on containers such as buckets)
Animal Anatomical	Orange (or appropriate labelling on containers such as buckets)
Non-Anatomical	Yellow

Proper segregation, packaging, in-house movement and storage should be well understood and are also outlined in the CCME Biomedical Waste Guidelines and provincial biomedical waste guidelines where available.

4.3.3 Waste Disposal Options

Biomedical waste is treated and disposed according to whether or not it is anatomical or non-anatomical.

Anatomical wastes at the present are largely restricted to incineration either in on-site hospital incinerators, off-site at other hospital incinerator facilities or off-site by commercial incinerators. For religious or ethical reasons, human anatomical waste consisting of organs or body parts, may in some cases, be buried with human remains in a cemetery or destroyed in a crematorium incinerator. Non-anatomical wastes can be

either incinerated or they can be landfilled following pretreatment. Pretreatment technologies are further defined in the CCME Biomedical Waste Guidelines and include autoclaving and selected chemical treatment. New technologies require regulatory approval. Recycling of waste materials after pretreatment of non-anatomical waste is also being explored by some facilities in the USA[8]. Blood and body fluids can be disposed of to sanitary sewers in small quantities if they are not contaminated with listed exotic communicable diseases as proposed by Health and Welfare Canada (see CCME Biomedical Waste Guidelines,

In Ontario in 1989, hospitals registered the disposal of their pathological wastes in the following manner:

TABLE 1 - Pathological Waste Registered for Disposal by Ontario Hospitals in 1989[9]

	Incinerated Pathological Waste (tonnes/year)			
# Hospitals	On-site Incineration	Off-site Incineration at Another Hospital	Transfer* Station	Out of Province Receiver
105	3,893.5			
44		727.5		
74			1,591.2	
32				278.0

* Transfer stations serve to bulk material for transportation to the final treatment/disposal facilities.

4.3.4 Obtaining Information about Waste Disposal

To determine the total quantity of biomedical waste disposed, obtain copies of your hospital's pathological waste disposal manifests or on site incineration records. If this information is not readily available, some measurements may have to be made (i.e. counting the number of biomedical waste boxes purchased). The OMOE waste class for this material is 312 P.

4.4 Liquid and Chemical Waste

4.4.1 Description

Hospitals use many liquid and chemical materials for various diagnostic and therapeutic purposes, as well as for maintenance of the physical and engineering operations of the facility. Liquid and chemical wastes can be classified according to the type of material. In Ontario, hazardous and liquid industrial wastes are defined inRegulation 309 issued under the Environmental Protection Act. To determine if wastes produced or accumulated fall into this category, refer to the Registration Guidance Manual for Regulation 309[5].

In Ontario, waste materials will require registration with the OMOE if quantities of designated hazardous materials are above a specified small quantity exemption limit. Liquid and solid wastes may also be produced that could have an impact on the environment in large quantities, but do not fall under OMOE's waste classification system. The types of potentially hazardous and liquid wastes that could be expected from a health care facility, their use and probable origin are given in Table 2. Some of the materials listed in the table may not require registration but are of concern for other reasons, e.g. chlorofluorocarbon (CFC) usage is being phased out due to new regulations for protection of the ozone layer[10].

TABLE 2 - Selected Liquid and Chemical Wastes Potentially Generated by Health Care Facilities

Material	Example & Use	Area of Expected Generation
Solvents		
Aromatics	Toluene, tissue staining	Laboratories, e.g. histology
	Xylene, tissue staining	Laboratories
Aliphatic	Methanol, tissue staining	Laboratories
	Ethanol, tissue staining	Laboratories, e.g. histology
Formalin	Formaldehyde/Methanol • tissue preservation (fixative)	Laboratories, e.g. pathology
	• cleaning of haemodialysis units	Patient Service, i.e. Haemodialysis
Halogenated	Methylene chloride solvent	Laboratories
	CFC, freezing application (1 lb canisters)	Laboratories
	CFC, air drying	Support Services: Engineering
	CFC, air conditioning	Support Services: Engineering
	Halons, fire extinguishing equipment	Support Services: Engineering (throughout building)
	Halogenated anaesthetic gas, anaesthetic gases i.e. halothane (Fluothane) enflurane (ethrane), isoflurane (Forane)	Support Services: Operating Room, Recovery & Anaesthesia
	Ethylene Oxide/CFC12 on-site sterilizing gases for medical procedural equipment	Support Services: SPD, Engineering
	Solvent still bottom residuals from on-site distillation of waste solvents	Laboratory
Miscellaneous Waste Organic and Inorganic Chemicals	Out of date laboratory chemicals of all types	Laboratories: all
	Mercury • broken thermometers	Patient care and patient service\ areas, e.g. biomedical engineering
	• batteries used in medical equipment, i.e. small IV pumps	Support services, surgery, transplant building. Patient services: Biomedical Engineering
	• expired fluorescent lights	Support services: Engineering (throughout building)

Table 2 (Contd.)

Material	Example & Use	Area of Expected Generation
Waste Oils	Lubricating oils in pumps	Support services: Engineering, Biomedical Engineering
	Vegetable cooking oils	Support services: Dietetics
Petroleum Distillates	Varsols, paint brush cleanup	Support services: Engineering
Photographic Chemicals	Fixers (containing silver) and developers, X-ray film developing	Patient services: Radiology, Ultrasound, Cancer Clinic Laboratories: Research Labs Support services: Audiovisual Dept.
Detergents/ Disinfectants	Phenol based disinfectants used for floor scrubbing	Support services: Housekeeping
	Detergents from cloth washing	Support services: Housekeeping
Pesticides/ Herbicides	Used in facility landscaping	Support services: Engineering or Contract workers
Others		
Waste Paints	Enamel, latex and oil based\ paints, from facility maintenance	Support services: Engineering
Macerated Food Wastes Liquids	Food waste particles and liquids (BOD), from macerating food wastes to reduce volume to disposal	Support services: Dietetics
Pressurized Cylinders	Metal pressurized cylinders, either empty or containing residual gas, to deliver specific gas requirements	Support services: Engineering and potentially throughout building

Sewer use bylaws in individual municipalities also dictate what materials can be disposed to the sewer system. At the present time, municipalities can have sewer use bylaws that vary substantially from one municipality to the next. Within the next several years, the introduction of a Model Sewer Use bylaw will likely occur throughout Ontario to help equalize the requirements of waste dischargers and reduce the quantity of hazardous wastes in the sewage treatment plant[11]. This sewer use bylaw will require wastewater evaluation for specific materials and the document should be consulted by both health care facilities in municipalities that have already adopted it and in other areas where its introduction is pending.

In our study, some attempt was made to comment on the disposal of high volume usage liquids and chemicals that resulted in direct sewer discharge or otherwise released to the environment unregulated. As changes occur in the sewer use bylaws, some materials which are currently sewer discharged may be designated as hazardous wastes and require registration.

4.4.2 Waste Handling

Liquid and chemical wastes which are designated as hazardous are collected into temporary containers and brought to storage drums in a secure chemical storage area until disposal is possible. Waste laboratory chemicals may be disposed of periodically (i.e. once every several years) when out of date materials, or those no longer required are removed from the laboratories. The proper disposal procedure using laboratory packing is described in Reference 12. Other wastes which are not designated as hazardous would be disposed of without further handling to the sanitary sewer, evaporated on-site, or, in the case of solids, to regular landfill sites. All laboratories should periodically inventory their chemical supply to ensure that outdated chemicals are disposed of and that they purchase what they need and do not keep an excessive supply.

4.4.3 Waste Disposal

Hazardous liquid and chemical wastes are manifested with the OMOE and sent for secure treatment and disposal by contracting a hazardous waste management company.

Some materials, such as solvents, may be used to process anatomical materials and absorbed into the specimen, in which case the waste is considered a biomedical anatomical waste and sent for incineration. Some of the waste may be taken to recyclers and reprocessors instead of disposal. These include solvents, waste oils, mercury, spent photographic fixer solutions, vegetable cooking oils. In other cases, laboratory chemicals may be "exchanged" to another laboratory for reuse.

4.4.4 Obtaining Information about Waste Disposal

Quantities of hazardous wastes can be determined by reviewing the manifest forms for any such waste transported off the facility. Wastes that are sent to regular landfill sites can be estimated from purchasing re ords. Wastes that are currently sewered can also be estimated from purchasing records, although it should be determined whether the wastes would still pose a degree of hazard after their use. Some materials (i.e. acids or bases) may be neutralized in use and, therefore, pose no real threat to the environment. Other materials, such as some solvents, may be simply released to the atmosphere as part of the general use procedure.

To estimate quantities recycled, obtain manifest forms where applicable (i.e. provincial waste manifests), any documents regarding the contract. or contact the recycler.

In 1989, Ontario hospitals registered 240 tonnes of hazardous liquid and chemical wastes for disposal (not including radioactive, pathological and pharmaceutical wastes). The primary categories of registered wastes are given in Table 3.

TABLE 3 - Selected Liquid and Chemical Waste Materials Registered for Disposal by Ontario Health Care Facilities in 1989 (II)

MOE Waste Code	Description	Quantity (tonnes/yr)	# Hospitals Registered
148	Miscellaneous waste inorganic chemicals	21.50	47
211	Aromatic solvents and residues	54.40	72
212	Aliphatic solvents and residues	49.40	39
213	Petroleum distillates	2.60	16
241	Halogenated solvents and residues	11.80	15
251	Waste oils and sludges	21.60	6
252	Waste crankcase oils and lubricants	18.00	27
263	Miscellaneous waste organic chemicals	12.7	42
270	Other spent organic sludges and slurries	27.2	1

4.5 Radioactive Waste

4.5.1 Description

Radioactive materials are used in hospitals for treatment and diagnosis. Radioactivity of materials will vary in the type of radiation emitted (i.e. alpha, beta, or gamma), the energies, half life and progeny (or decay products). Table 4 shows the different types of radiological materials which may be used by health care facilities, their possible uses and location of the user. The Table is divided into two components: (a) sealed sources; and, (b) unsealed sources. Sealed sources of radioactive materials are, by definition, "sealed in a capsule or having a bonded cover"[13] Unsealed sources or open sources are sources of other radioisotopes that are administered to patients or used in research experiments or testing procedures. This list of materials may vary, depending on the facility.

Radioactive wastes are generated in small quantities in a number of Patient Service and Laboratory areas. Materials such as containers, gloves, paper towels, etc., which have come into contact with these materials, would also be considered radioactive.

4.5.2 Waste Handling

The handling and disposal of radioactive wastes is regulated by the Atomic Energy Control Board (AECB). Licences issued for use of radioactive materials include the proper handling and disposal procedures for used materials. A number of isotopes used in the hospital have relatively short half lives which are kept on-site in a secure lead shielded area until sufficient decay has taken place for disposal as clean waste, as described in the following section. Radioactive material handling in the hospital is generally supervised by a designated officer on site.

TABLE 4 - Typical Radioisotope Usage in Health Care Facilities

			Use			
			Cal-bration	Mark	Machine	Area Used
(a) Sealed Source						
						Patient Service:
Americium	Am	241	X			Nuclear medicine
Barium	Ba	133	X			Nuclear medicine
Cobalt	Co	57	X	X		Nuclear Medicine
Cobalt	Co	60	X			Nuclear Medicine
Cesium	Cs	137	X		X	Nuclear Medicine, Cancer Clinic
Gadolinium	Gd	153			X	Nuclear Medicine
Tridium	IR	192			X	Cancer Clinic
(b) Unsealed Source						
						Patient Service:
Technetium	TC	99	X			Nuclear Medicine
Iodine	I	131	X	X		Nuclear Medicine
Chromium	Cr	51	X			Nuclear Medicine
						Laboratory, Patient Service:
Cobalt	Co	57	X		X	Biochemistry/Nuclear Medicine
						Patient Service:
Cobalt	Co	58	X			Nuclear Medicine
Gallium	Ga	67	X			Nuclear Medicine
						Laboratory, Patient Service:
Phosphorus	P	32			X	Research Labs/Nuclear Medicine
						Patient Service:
Thallium	Th	201	X			Cardiopulmonary/Nuclear Medicine
						Patient Service, Laboratories:
Tritium	H	3			X	Nuclear Medicine/Research Labs/Biochemistry
						Laboratories, Patient Service:
Carbon	C	14			X	Research Labs,Nuclear Medicine

Table 4 (Contd.)

			Use			
			Cali-bration	Mark	Machine	Area Used
Iodine	I	125			X	Patient Service, Laboratories: Nuclear Medicine/Research Labs/ Biochemistry
Iodine	I	123	X			Patient Service: Nuclear Medicine
Iodine	I	131	X			Cancer Clinic
Indium	In	111	X			Nuclear Medicine
Sulfur	S	35			X	Laboratory: Research Labs

4.5.3 Waste Disposal

Radioactive wastes with short half lives (i.e. generally unsealed sources) can be disposed of as general waste, following on-site decay. The quantity of radioactive waste disposed of as solid non-hazardous waste or liquid sewerable waste is difficult to estimate, due to the different half lives of the isotopes used, variances in the actual time the material is kept on-site before usage, and the other unknown fate of the material (i.e. patient radioisotope dosage excreted to sewers at hospital or at home).

Maximum allowable radioactive waste levels are calculated according to dilution with either total water usage at the hospital or total solid wastes disposed of. Water usage rates are based on 1,000 L per patient bed per day for purposes of dilution calculations, as set by AECB[13]. Low level radioactive wastes contained in solvents (i.e. tritium used in liquid scintillation counting in laboratories) are treated as liquid chemical waste for purposes of disposal and could be incinerated. Containers from radiologicals are often sent back to the supplier. Outer containers (i.e. lead or plastic containers) can be recycled if they are not contaminated with radioactive spills. AECB must evaluate alternative disposal procedures or recycling opportunities for materials which have been previously considered radioactive and give their written approval.

Sealed sources of radioactivity (and any associated contaminated material, such as containers) generally have longer half lives and need to be disposed of to a receiver approved by Atomic Energy Canada Limited (AECL), or to AECL.

4.5.4 Obtaining Information about Waste Disposal

Waste quantities disposed of to secure sites can be determined from waste disposal records. Other quantities of open source materials used on site can be determined by purchase needs and book-keeping records by persons authorized to use the materials.

4.6 Pharmaceutical Waste

4.6.1 Description

Pharmaceutical wastes include patient treatment drugs, such as prescription drugs, narcotics and cytotoxic chemicals such as chemotherapy and antineoplastic drugs. Cytotoxic materials are the most hazardous of the group. Procurement and compounding of drugs generally takes place through pharmacy or clinics such as in cancer treatment. Cytotoxic wastes include any extraneous materials that may come into contact with the drugs, such as gloves, paper towels or syringes, as well as IV bags that may be used for administration purposes and filters from the fume hood preparation areas.

4.6.2 Waste Handling and Disposal

Pharmaceutical waste materials are handled and disposed of as follows:

Pharmaceutical wastes (e.g. prescription drugs) which are generated in Patient Care areas are flushed down the toilet by a nurse (generally with a witness). Those wastes which are generated in Pharmacy as off spec or outdated material are returned to suppliers or flushed down the toilet following possible inspection by supplier representative. Narcotic wastes are kept locked on-site according to the Narcotics Control Act. Disposal requires written permission by an authority of the Narcotics Control Act which has federal jurisdiction.

Cytotoxic wastes are handled with special precautions. All items that may come into contact with these types of materials are considered contaminated and should also be treated as cytotoxic. The disposal options currently available to this waste group are as follows[6]:

(1) incineration in temperatures in excess of 1000°C
(2) chemical deactivation which may be appropriate for some agents.

Cytotoxic wastes are often handled with pathological waste and are given a special labelled bag to ensure proper handling takes place. Cytotoxic wastes will likely be the largest waste group measurable under pharmaceutical wastes.

4.6.3 Obtaining Information about Waste Disposal

Waste disposal records for disposal of cytotoxic wastes may be available from pathological waste disposal records, if distinctions between the different waste types were made. Narcotics and prescription drug disposal information might be obtained from pharmacy representatives, although, generally, this information will not be recorded.

5. DETERMINING MAJOR HOSPITAL CHARACTERISTICS AND COMPARING THESE TO OTTAWA GENERAL HOSPITAL

As noted in the Introduction, the waste type and quantity will vary from hospital to hospital, but may be influenced by three main concerns:

(1) range of services offered by the facility
(2) the size of the facility
(3) the purchasing policies with regard to proportion of single use items.

In order that this document may be used by other hospitals in determining waste types and quantities generated, it is important to understand how similar OGH is to any other facility.

Table 5 lists hospital descriptors important for waste management considerations which include specific questions on the size, services offered and activities in the hospital. Use the blank copy to fill out information about your facility. Further description of current purchasing policies at the hospital should also be reviewed. This is done by filling out Table 6 and identifying the proportion of reusables and single use items for large usage materials. Compare both these tables to those of OGH in Tables 7 and 8 and read the following Section to better understand how similar OGH may be to your facility. This will give you a better idea of how similar your waste streams may be.

TABLE 5 - Hospital Descriptors Important for Waste Management Considerations

General Information:

Hospital Name:

Address:

Location (i.e. urban, rural):

Type of Hospital/Specialties:

Physical Size (m^2 or ft^2):

Occupancy Information:

No. of Beds:

Avg. Bed Occupancy Rate:

No. of Out Patients Served:

No. of Surgical Procedures:

No. of Full Time Equivalent Staff:

Major Support Services Offered:	On-Site	Off-Site
Cafeteria:		
Laboratory Services:		
Decontamination, i.e. steam sterilization of wastes:		
Eto/CFC_{12} sterilization of medical procedural products		
Other		

Material Management Information:

Material Management System

Medication Distribution

Universal Precautions in Place?

Table 5 (Contd.)

Waste Management Information:

List major current reduction, reuse and recycle initiatives.

List on-site pretreatment methods for infectious non-anatomical biomedical wastes.

List biomedical waste disposal routes used.

List general waste disposal routes used.

TABLE 6 - Use of Selected Items Which Have Readily Available 'Reusable' Alternatives in Hospital Use that can Contribute Significantly to Solid Waste Quantities

Items	Single Use Items	Reusables
Medical Materials		
Diapers		
Incontinence		
Underpads		
Drapes		
Linen Gowns		
Trays		
Foam Mattresses		
Others		
Cafeteria		
Cutlery		
Dishes		
Trays		
Cups		
Single Serving drink containers		
Single Serving Condiments		
Others		
Patient Food Delivery		
Cutlery		
Dishes		
Trays		
Cups		
Single Serving Drink Containers		
Others		
Food Preparation		
Bulk preprepared Food Cont.		
Bread Trays		
Other		

TABLE 7 - Hospital Descriptors Important for Waste Management Considerations

General Information:

Hospital Name: Ottawa General Hospital

Address: 501 Smythe Street

Location: Ottawa, Ontario K1H 8L6

Type of Hospital/Specialties: General Teaching Hospital

Physical Size: 62,477 m^2

Occupancy Information

No. of Beds: 529 Avg. Bed Occupancy Rate: 93%

No. of Out Patients Served: ? No. of Surgical Procedures: 13000/yr

No. of Full Time Equivalent Staff: 3,400

Major Support Services Offered:	On-Site	Off-Site
Cafeteria:	X	
Food Preparation:	X	X
Laundry Services:		X
Printing Services:	X	
Laboratory Services:	X	
Decontamination, i.e. steam sterilization of wastes:	X	
Eto/CFC_{12} sterilization of medical procedural products:	X	

Table 7 (Contd.)

Material Management Information:

Material Management System	Friesen
Medication Distribution	Unit dose
Universal Precautions in Place?	Yes

Waste Management Information:

List major current reduction, reuse and recycle initiatives.

See Tables 9 and 10

List on-site pretreatment methods for infectious non-anatomical biomedical wastes.

Steam Autoclave

List biomedical waste disposal routes used.

Infectious non-anatomical - Steam autoclave, then landfill
Anatomical - Incineration (public facility and commercial facility - non on site)

List general waste disposal routes used.

Some recycling (see Table 10)
Otherwise landfill using compactor

TABLE 8 - Use of Selected Items Which Have Readily Available 'Reusable' Alternatives in Hospital Use that can Contribute Significantly to Solid Waste Quantities at Ottawa General Hospital

Items	Single Use Items	Reusables
Medical Materials		
Diapers	X	
Incontinence	X	
Underpads	X	
Drapes		X
Gowns		X
Trays	X	X
Cafeteria		
Cutlery	X	X
Dishes	X	X
Trays		X
Cups	X	X
Patient Food Delivery		
Cutlery	X	X
Dishes	X	X
Trays		X
Cups	X	X
Food Preparation	X	X
Bread Trays	X	X
Bulk preparation food containers		

5.1 Ottawa General Hospital

Ottawa General Hospital (OGH) Is a large urban teaching hospital, located on a medical sciences campus which includes the University of Ottawa, Health Science Building, Children's Hospital of Eastern Ontario, Royal Ottawa Rehabilitation Centre, Children's Treatment Centre and the National Defence Medical Centre. OGH is the host hospital to Ottawa Regional Cancer Centre.

It is a 529 bed hospital, housed in an eight storey building which, from Floors 3-8 is shaped like an H. Floors 3-8 are dedicated to Patient Care, while Floors 1 and 2 house most of the Patient Services, Administration and Support Service, and laboratories.

Table 7 summarizes a number of characteristics of OGH, including physical, operating and services offered.

Further details on services offered will be found in Appendix 2, where waste generation rates are related to activity factors for each service offered by the hospital. The hospital is divided into 6 major functions:

Patient Care:	The bed areas (e.g. obstetrics)
Patient Services:	Areas that provide diagnostic, therapeutic or other medical services to patients (e.g. clinics)
Laboratories:	Areas that conduct sample analysis (e.g microbiology)
Administration:	Office areas (e.g. Purchasing)
Support Services:	Areas which supply functions that maintain the building's viability and individual comfort and necessities (e.g. cafeteria)
Miscellaneous:	Any activity area that is not included in the services above (e.g. building exterior areas)

Individual services and the level of activity offered under each of these six headings are found in Appendix 2.

As well as understanding what services are offered, there are a number of other factors which are important to understand how similar other hospitals might be to OGH in terms of waste generation. These include whether certain services are offered on-site or off-site, e.g. laundry, printing, food preparation, etc. These are detailed for OGH on Table 7. Other factors that will influence waste generation are the choices that hospitals have already made with regard to the use of disposables versus reusables (e.g. diapers, drapes, gowns, trays, etc.) Table 8 details current practices at OGH.

Some specific characteristics of OGH, which may influence the amount of waste, or in which sections of the hospital these are produced, are discussed briefly below.

OGH operates on the Friesen system of materiel management.

Under this system pharmaceutical supplies are all distributed from central pharmacy in unit doses while other incoming materials are distributed from Supply, Purchasing and Distribution (SPD) in individual packages to individual Nurse servers that service one or two patients. Back-up central supply rooms are located on each floor for off-hours replacement of commonly used supplies. While this method of distribution is unlikely to have a major impact on the total quantity of waste produced by the hospital, it does influence where waste may be produced. Most overpackaging, corrugated cartons, shrink wrap, etc., will be removed in SPD, which was shown as the major source of this waste at OGH. For hospitals with different distribution systems, some of this waste may appear in the patient care areas.

Ottawa General uses a central commissary which supplies a number of hospitals in the Ottawa area. Fully or partially prepared foods are delivered to OGH for reheating and distribution to both cafeteria and patients. This practice leads to a reduction in the amount of food waste generated by the initial preparation area outside of OGH. It also results in a change in the type of packaging disposed when compared to a

hospital kitchen that prepares everything from raw food materials. Reductions in the amount of waxed corrugated, but increases in plastic and disposable aluminum pans, are a few examples of differences that can be expected by using a central commissary.

OGH also uses an off-site central laundry facility which, again, is shared by a number of Ottawa hospitals. This eliminates any waste associated with laundries that might occur in hospitals with on-site laundries. The central laundry in Ottawa is very cost effective and makes reusable linen gowns and drapes very much the rule at OGH. For hospitals using more disposable items, their waste quantities, in areas where those are used, will be higher than those measured at OGH.

OGH uses unit dose as a means of distribution from a central pharmacy. Blister packs are produced in the pharmacy for tablet distribution throughout the hospital. Unit dose injectables from suppliers are unpacked from multiple dose packages and distributed in unit dose to the nurse servers. The majority of bulk packaging waste associated with pharmaceuticals remains in the pharmacy which is the point at which this waste is recorded as being generated. Some additional packaging waste is created by blister packing of unit tablet doses. This waste is discarded in the patient care areas.

OGH is already involved in some recycling initiatives, including fine paper and computer print-out paper from administration areas, plus cans from the cafeteria. A description of waste reduction and reuse activity is given in Table 9 and recycling initiatives in Table 10.

OGH follows a practice of universal precautions, that is, handling all waste from patients assuming that it is potentially infectious. All waste, apart from body fluids and sharps from the patient care areas, is handled carefully, but packaged in green garbage bags as general waste. Only in unusual circumstances is waste from the patient care area handled as "infectious waste". During our audit, only one patient was designated as infectious, and waste from this one patient was treated as biomedical

TABLE 9 - Current Reduction and Reuse Activities at Ottawa General Hospital

Section	Material/Activity	Benefit
Patient Care		
Short Stay	Reuse garment bags	Reduce purchase of new bags and produce less waste
	Have gone away from disposable trays (i.e. mouth care & epidural tray)	Reduceswaste and saveson purchase of new trays
Patient Service		
Diagnostic		
Cardiopulmonary	Spent laser cartridge sent for regeneration and reuse	Reduce costs for cartridge and less waste produced
Neurophysiology	Use reusable sheets in clinic area	Reduce waste and save on purchase of new sheets
Nuclear Medicine	Containers for radiologicals returned to suppliers	Reduce waste disposal
	Unused material returned to suppliers	Reduce waste disposal
Ultrasound		
Ophthamology		
Radiology		
Therapeutic		
Occupational Therapy	Wood waste from patient projects taken by staff for fireplaces	Reduce wood waste at OGH
	Splint scraps used to make smaller splints	Save on purchasing new small splints and reduce waste

Table 9 (Contd.)

Section	Material/Activity	Benefit
Physiotherapy	Reuse scrap paper/CPO	Reduce paper waste and save on purchase of new supplies
Speech Therapy	Reuse all paper on both sides	Reduce waste and less purchase of new paper
	All staff have own mugs	Reduce foam cup waste and save on new foam cup purchases
	Use pens with ink cartridges	Reduce pen waste
Service		
Cancer Clinic	Reusable nurses' uniforms	Reduce waste from disposable uniforms
	Use Reusable dressing trays provided by OGH	Reduce plastic waste
Dialysis	Replace formalin with less toxic Amuchina solution to clean dialysis machines	Reduce quantity of formalin into sewer
Pharmacy	Unwanted pharmaceuticals (approximately 20 kg)	Send to private pharmaceutical company for reuse Reduce waste for OGH and save on raw materials from pharmaceutical company
Laboratories		
Oncology	Using micro experiments developed to use less reagents	Reduce purchasing costs for reagents and for disposal of waste
	Replaced regular scintillation solvent with less toxic material "Ecoscint"	Reduce cost for waste disposal (i.e. no special handling required)

Table 9 (Contd.)

Section	Material/Activity	Benefit
Research	Several OCC boxes reused by staff at home	Reduce solid waste
	Cold packs used in shipping temperature sensitive materials reused by other researchers	Reduce solid waste and reduce need for purchasing new cold packs
	Using micro experiments for scintillation counting where possible, i.e. use plastic insert in glass vials - discard insert and reuse vials	Reduce waste/reduce cost in purchasing new vials
	Reuse bottles from reagents as purchased, i.e. fetal calf serum bottles	Reduce waste/reduce cost in purchasing new containers
	Replaced regular scintillation solvent with less toxic material "Ecoscint"	Reduce cost for waste disposal
Support Services		
Administration		
Public Relations	Pre-prepaid outdated report coversand envelopes reused internally	Reduce need for new materials and cuts down on waste for disposal
Finance	Starting to microfiche reports for department use	Reduce need for storage space and less paper waste generated in future
Dietetics	Purchase some bulk foods (i.e. milk, juices)	Reduce packaging waste
	Encouraging 'Lug a Mug' program by sale of reusable plastic mug in cafeteria	Reuse of drink container reduces dependence on disposable cups

Table 9 (Contd.)

Section	Material/Activity	Benefit
	Reusable cutlery and dishes provided for majority of meals	Reduce quantity of packaging material for disposal
	Delivery company uses reusable bread trays	Reduce packaging waste
	Delivery company uses reusable croissant trays	Reduce packaging waste
Engineering Services		
Plant Operations	Purchase unformatted rolls of air filter fabric and cut for own use as required in air filtration system	Result in less waste produced because no permanent/activity frames are required
Housekeeping		
	Wiping rags which are used to clean throughout the facility are washed and reused on-site	Reduce purchasing costs of new rags and save on disposal costs
S.P.D.		
Receiving	Reuse packaging material, i.e. save several smaller boxes and packing material for repacking own deliveries	Reduce packaging waste and save on purchase of new containers
Inventory Prep & Pack	Reuse 1,364 tonnes (3 million lbs) of linen per year	Save 1,364 tonnes/year of potential solid waste from disposal
	Sterilize several hospital owned medical trays and instruments on-site for reuse	Reduce quantity of disposable plastic trays and accessories disposed
	Reusable plastic boxes for instruments going to OR	Eliminate wrapping for instruments
Communication	Old computer printouts from long distance phone calls put together to make note pads	Reduce purchasing of new paper for pads and less waste disposed

TABLE 10 - Current Waste Recycling Initiatives at Ottawa General Hospital

Section	Material	Activity	Estimated Quantity
PATIENT CARE			
Short Stay Unit	Aluminum cans	Taken to Doctors' Lounge by OR for recycling	Included in total for dietetics
PATIENT SERVICE			
Diagnostic			
Nuclear Medicine	Photographic fixer solutions	Taken to Radiology darkroom for recovery	Unavailable
Ultrasound	Photographic films	Sent for silver recovery with Radiology Lab	6 tonnes/year (26,000 films/year i.e. 100/day)
	Fixer solution	——— do ———	2,180 L/year of fixer solution
Radiology	Photographic film	Packaged and sent for silver recovery	Unavailable
	Fixer solutions	Silver recovery machine Onsite	40 kg silver recovered/year
Therapeutic			
Speech Therapy	Glass juice bottles	Staff take bottles home for recycle in blue box	Unavailable
Biomedical Engineering	Nickel cadmium and lead acid (gel) batteries	Expired batteries from specialized medical equipment sent to battery supplier/recycler in Ottawa	50 kg/year

Table 10 (Contd.)

Section	Material	Activity	Estimated Quantity
	Mercury	Collected from spills from broken thermomenters, mamometers, wall mounted blood pressure units taken to recycler	10 kg/year
	Old equipment & supplies	i.e. beds, ECG machines which are no longer needed are given to charitable organizations specializing in repair/delivery to 3rd World Organizations	Unavailable
Cancer Clinic	Photographic films	Recovery of silver by outside firm	3 tonnes/year (~ 11,700 films/ year. i.e. 40-50 day)
	Fixer solutions	Silver recovery	Unavailable
Dialysis	Plastic jugs (10 L, empty containers from sodium bicarbonate solution)	48 containers/year sent to another hospital	24 kg/year
	Cardboard boxes	Some taken home by staff	Unavailable
Surgery/Operating Rooms	Aluminum drink cans	Collected for recycling	Unavailable

Table 10 (Contd.)

Section	Material	Activity	Estimated Quantity
LABORATORIES			
Research	Polystyrene boxes used for shipment of temperature sensitive materials	Containers sent back to suppliers - some suppliers have prepaid postage on containers (i.e. Dupont/ New England Bio Labs take containers back)	Unavailable
	Lead containers for radio-isotopes (350 g each) approx 1 per week	Lead containers returned for recycling Suppliers do not want them back OGH is now asking for plastic containers instead	18.2 kg/year
	Unused lab chemical	Internal lab chemical exchange program Could increase this activity with better contacts at universities	Unspecified
	Paper from memos and mail	Taken to university where it is recycled with paper recycling program	Unavailable
Oncology	Polystyrene boxes from material receiving	Sent back to supplier (~ 1 per week)	15 kg/year
	5-10 prints per week sent for development	Silver recovery from fixers at Cancer Clinic lab	Unavailable
	Paper waste collected	Taken to university for paper recycling program	Unavailable

Table 10 (Contd.)

Section	Material	Activity	Estimated Quantity
ADMINISTRATION			
Administration, MIS, Purchasing	Mixed paper	Collected for recycling by Florence Paper	~5,000 kg/.year (2,943 kg/7 months)
SUPPORT SERVICES			
Dietetics	Cooking oils in Cafeteria	Extended life of cooking oil by incorporating filter, and recycle to Orenco (rendering)	4,320 L/year
	Aluminum cans by vending machines (including OR area)	Collected for recycling	450 kg/year (estimated 2 bags/week, ~ 300 cans/bag)
	(Aluminum trays)	(Meals on Wheels program currently recycle trays in pilot program)	(166.4 kg/year not included in total OGH waste, 20 g tray, 160 units/week)
	Waxed cardboard trays for baked goods	Bakery collects and reuses	Unavailable (est. 500 g/tray)
Engineering			
Electrical	Scrap metal from repairs	Have own scrap metal recycling bin	~25 kg/year
Physical Plant	Motor/lubrication oil	Used oil taken by employee who uses it for undercoating	450 L/year

Table 10 (Contd.)

Section	Material	Activity	Estimated Quantity
Plant Operations	Drums from HCl	10 drums/year returned to supplier (Stan Chem)	250 kg/year
	Drums from sodium hypochlorite	Returned to supplier	Unavailable
	CFC12 containers	Returned to service company (Trane)	Unavailable
	CFC11 used in chillers	Service company recycles CFC11 as required (OGH has 2 x 1000 tonnes/units	Unavailable
	CFC12 used in air driers	4 (3.5 lb) units; 1 (2.125 lb) unit. Service company recycles CFC12 as required	Unavailable
S.P.D			
Receiving	Skids/pallets	Skids are taken back by one of major medical products company (Baxter) and others recycled by pallet recycler	32,500 kg/year (est. 50-60 per week)
Inventory Control	Computer printout (CPO)	Recycled via MIS paper recycling program	

Table 10 (Contd.)

Section	Material	Activity	Estimated Quantity
Telecommunication			
Communication	Out of date telephone	Picked up for recycling by local farmer for use as animal bedding	3,340 kg/year (1,000 white books pages/year:1.5 kg each; 1,000 yellow pages/ year:1.8 kg each)
Printing	Fixer solutions	Collected for recycling with radiology silver recovery unit	270 L/year of fixer

waste and sent for autoclaving prior to disposal. In most cases, taking extra precautions, like using gloves more frequently when in contact with patients, will increase the quantity of waste produced.

Anatomical waste is collected, stored in refrigerated storage and shipped as necessary to an incinerator in an adjoining health care facility or to a commercial incinerator when the regular incinerator is not available.

Waste designated as infectious non-anatomical biomedical waste, such as sharps containers and laboratory waste, are autoclaved prior to disposal with other general waste.

6. HOW TO ESTIMATE APPROXIMATE WASTE GENERATION RATES

This Section will be divided into: 6.1 estimating solid waste generation rate; and 6.2 estimating other waste generation rates.

6.1 Estimating Solid Waste Generation Rates

The data in Appendix 2 from OGH have been presented in a fashion that is designed to allow other hospitals to use it to estimate their own waste generation rates.

This section will identify the different steps that need to be undertaken to estimate approximate waste generation rates in your hospital. These steps are:

(1) Conduct detailed comparison of the functions and services of your hospital and OGH
(2) Set up tables which will be used to record waste types and quantities generated in separate areas of activity
(3) Determine type of activity factors used for separate areas of activity
(4) Determine activity levels for separate areas of activity
(5) Determine predicted weights of various waste components generated using data provided in Appendix 2
(6) Calculate the total waste quantities for your hospital from the new table

Step 1

The first step is to conduct a detailed comparison of the functions and services of your hospital with Ottawa General using the information presented in Section 5 and in Appendix 2.

If you think that your hospital is similar to OGH, a first check that you can do is to compare total waste generation per bed for the whole hospital.

This is very easy to do. Ask the companies who have the contracts to dispose of your general solid waste for records of total quantities disposed per week. Check through records showing quantities from other weeks to make sure this is representative. Divide this quantity by the number of beds in the hospital and then divide by 7 (7 days/week) to get a waste generation rate in kg per bed per day. For OGH, this quantity is about 6.3 kg/bed/day (i.e. for OGH, 23,400 kg/week ÷ 529 beds ÷ 7 days/week = 6.3 kg/bed/day).

If your answer is quite different, even though you thought your hospital was comparable, it suggests you should go back and reexamine where there may be differences. If your answer is quite similar, you can probably proceed with some confidence to use the data from OGH to estimate waste generation for your own hospital.

If you find a number of similarities and a number of major differences, you can take a combined approach of using the OGH data for estimating where similarities occur and undertaking detailed audits of those areas which significantly differ from OGH.

If you find no similarities between your hospital and OGH, then you may have to conduct a detailed waste audit as described in Section 7. Smaller facilities could use this manual as a guide to identify waste reduction opportunities.

Step 2

Having determined how much of the data available from OGH is relevant to your hospital, the econd step is to set up tables which you can use to estimate the quantities and types of waste being generated in your hospital. One set of blank tables is included as Table 11. This includes all the specific waste components identified according to study at OGH and divides the materials into material groups, i.e. paper, plastics, etc. This table does not include the hospital activity area e.g. microbiology lab, obstetrics, etc., which will have to be filled in according

Table 11. Hospital Waste Generation Worksheet, General Solid Waste (kg/yr)

Sections	Activity Descriptor	Activity Level	Paper						
			Potentially Recyclable						
			Boxboard	CPO	Fine	Kraft	Newspaper	OCC	Total

Table 11. Hospital Waste Generation Worksheet, General Solid Waste (kg/yr)

Sections	Activity Descriptor	Activity Level	Potentially Non-Recyclable								Total Paper
			Diapers	Incont-inents	Under pads	Non Recyclable	Wet Paper and Gauze	Medical Sterile Pack.	Hair nets Boots etc	Total	

Table 11. Hospital Waste Generation Worksheet, General Solid Waste (kg/yr)

Sections	Activity Descriptor	Activity Level	Plastic							
			Non-Recyclable			Recyclable				
			Medical	Gloves	Total	Packaging	Food and Container	Polystyrene	Total	Total

Table 11. Hospital Waste Generation Worksheet, General Solid Waste (kg/yr)

Sections	Activity Descriptor	Activity Level	Glass						Total Glass	Metal		
			Recyclable			Non-Recyclable						
			Clear Container	Amber Container	Total	Clear BoroS.	Amber BoroS.	Total		Medical	Food	Total

Table 11. Hospital Waste Generation Worksheet, General Solid Waste (kg/yr)

Sections	Activity Descriptor	Activity Level	Food	Liquids					Misc.	Total Recyclable	Total Non-Recyclable	Total General Waste	Overall Percent
				Medical	Blood	Urine	Food	Total					

Table 11. Hospital Waste Generation Worksheet, Biomedical Wastes (kg/yr)

Sections	Activity Descriptor	Activity Level	Sharps Container Wastes	Non-Anatomical Infectious Wastes	Sub Total	Anatomical Wastes	Cytotoxic Wastes	Sub Total	Total Biomedical Wastes	Overall Percent

to your specific hospital. Reproduce as many sets of these tables as you think you will need for the areas which you can estimate, then write in the names of each activity area in the left hand column.

Step 3

Step 3 is to determine what activity factors should be used for each of the activity areas for your hospital. Using Appendix 2, as a guide, determine what factors are to be used for what areas. For example, for all of the patient care areas, these are "beds occupied". For laboratories, these are "thousands of samples analyzed/year", and for admin areas "per person on staff" (i.e. full time equivalent). Fill in the column marked activity factor for your table.

Step 4

Step 4 is to determine specific values for the activity levels in your hospital. This will require a fair amount of work to pull together all of this information if it is not readily available. Hospital statistics reports should be obtained which indicate what these are. As an example of the information required and how to use it, let us consider the Orthopedics area in patient care, We have already determined that the activity factor is "beds occupied". For OGH, this figure is 39.8 average bed occupied/year (i.e. 40 beds x 99.4/100 percent occupied = 39.8 average bed occupied/year) as obtained from OGH hospital statistics. This value should be entered into your table in the column headed "activity level". This is then repeated for all areas being considered.

Step 5

Step 5 is the final step to arrive at the predicted weights generated by your hospital per year. This is an easy mathematical exercise using Appendix 2, and the activity levels you have determined for your hospital.

Each material category cell in Appendix 2 is measured as kg/activity level per year.

For example, in Orthopedics, if you determine your activity level is X (beds occupied/year) from Step 4, you can follow across the row for Orthopedics multiplying the value in each material category cell of waste generation rates in kg/activity/year by X. This product is the amount of each material category component of the waste generated by Orthopedics in your hospital in kg/year.

These numbers can be recorded in your own table.

Step 6

Step 6 begins when the table is completed. The columns can be summed to give total predicted quantities of waste and waste components generated by those areas of the hospital considered sufficiently similar to OGH to use this predictive model. For areas not considered similar, a detailed auditing of waste may have to be undertaken, as described in Section 7.

A useful check before proceeding to a detailed audit for those areas not predicted is to compare the predicted total waste quantity with waste disposal records to determine what proportion of total waste generated has been predicted. Perhaps, if this is quite a high percentage, you could proceed to consider reduction, reuse and recycling opportunities without doing a detailed audit of the other areas.

6.2 Estimating Other Waste Generation Rates

Estimating waste generation rates for other waste categories may be approached in a similar fashion in using the tables to calculate estimated quantities. However, in the case of these other waste groups, liquid/chemical wastes, radiologicals and pharmaceuticals, the data are much less complete and reliable. The quantities of wastes generated in these groups are much smaller and, since these waste materials were measured indirectly at OGH, it may be better to arrive at figures for your own hospital from purchasing or disposal records.

Biomedical waste quantities' generation will be variable in different hospitals according to what is included as biomedical wastes. For example, packaging wastes, paper towels and gloves are often included as biomedical wastes because of the contact with these biomedical waste materials and may greatly increase the real waste volumes. Records for disposal of total quantities of biomedical wastes sent off-site would be available from generator registration information. Where biomedical waste is incinerated on-site, obtain estimates of the number and weight of bags disposed of.

7. CONDUCTING A DETAILED WASTE AUDIT

7.1 Introduction

A detailed waste audit requires extremely good organization to: (a) get as much as possible out of it; and, (b) to do it in a timely and cost effective manner. We have described the audit as proceeding in 4 main steps:

- Conducting the pre-audit
- Determining the total waste generated by separate hospital activities
- Relating solid waste generation to activity levels
- Determing the specific components of the clean general waste stream

These are discussed in detail below. It is imperative that a good job is done in the pre-audit step. Conducting a detailed waste audit at a major hospital requires 5-10 people on site, 12-15 hours per day, for about 2 weeks. If all of the requirements of the pre-audit step are not fulfilled, these people will not be utilized effectively and the data they generate will not be as useful as it could be.

7.2 Conducting the Pre-Audit

7.2.1 General Information Gathering

There is a lot of information that needs to be gathered before the audit begins. These are discussed very briefly below in note form.

Building Layout

Obtain a set of plans; ensure that they are **up to date**, and sufficiently detailed to understand where different activities are located. Become

familiar with the layout. These plans are your road map for conducting the audit.

Determine What Activities Occur in the Hospital

The activities in a hospital fall under 6 main functions:

Patient Care
Patient Service
Laboratories
Administration
Support Services
Miscellaneous

Obtain sufficient information to further sub-divide these 6 functions into discrete sub-sections, e.g. for labs: Microbiology, Histology, Biochemistry, etc. Mark these discrete functions on the building layout plans so that waste generation measured from a geographic location can be linked to the activity occurring there.

For each activity, determine when it occurs. For example, for patient care, this is a 24 hour/day, 7 day/week activity, but, for clinics in the patient service area, many of these functions are 8-4, 5 days/week.

Obtain a List of Contacts

For each activity identified, get a specific contact with phone number who is able and willing to answer questions about their particular activity.

Obtain Waste Management Practice Guide

Infection Control or Occupational Safety staff should have available a waste handling guide for staff at the hospital (i.e. Waste Management: Policies and Procedures). Obtain a copy of this, and become familiar with the potential hazards in handling and sorting hospital wastes. This

guide is also useful in understanding how this particular hospital defines and handles different types of waste (see Section 4).

Obtain Other Useful Information

There are a number of other sources of information that are very useful, either as a primary source of information, or as a cross-check on measured data. These include:

- Waste disposal records for non-hazardous wastes (from Purchasing)
- Recycling records (from Purchasing)
- Purchasing records (from Purchasing and other sections who purchase items separately)
- Service and occupancy records (Hospital statistics from Materials Management)
- Waste generator registration data (from Environmental Co-ordinator or Occupational Health and Safety)
- Workplace Hazardous Materials Information System (WHMIS) information (from Occupational Health and Safety)

Try to gather as much of this information as is available prior to starting the audit.

7.2.2 Getting Ready to Start

There are a number of activities that are really a part of the audit, but can be done prior to the full audit team being ready to start. These activities can be undertaken by 1 or 2 people.

Hold Meetings with Contacts

This is an excellent way to start the audit. By holding meetings with the designated contacts, you will be able to better understand activities

within the hospital and help others in the hospital to: (a) obtain better appreciation of the scope, purpose and mechanism of the audit; and, (b) contribute information on waste management practices in their activity area and ideas about opportunities for waste reduction. You may want to use the contact sheet format developed at OGH for initial questioning at these meetings (see Figure 1).

7.2.3 Activities Specific to Clean General Waste Auditing

Find an Area Suitable for Garbage Sorting

To determine the composition of waste being generated, a large number of garbage bags have to be opened and sorted into their components. An indoor area of about 20' x 20' is ideal with tables set up to facilitate sorting. A 115 v power source is also required. This may be one of the most difficult things to secure. We were very fortunate in Ottawa having an unfinished part of the building which we could use. Since the area is being used to sort garbage, it must be removed from the patient care and service areas.

Assemble Equipment and Supplies

Equipment required to conduct a waste audit includes:

- Tarps
- Coloured tape that sticks securely to garbage bag
- Garbage bags (various sizes)
- Garbage bag holders
- Pushing sticks
- Trays (for weighing)
- Tongs
- Tables
- Knife to cut open bags
- Organic vapour and dust masks
- Coveralls

FIGURE 1 - Waste Audit Contact Sheet

Section: Activity Type:

Location: Floor:
Room Nos.:

Contact: Position: Phone No:

Staffing: FTE: Hours Worked: M-F:
S-S:

Description of Activities:

Activity Variable: ie No. of Samples Processed/Year:
No. of Patients Seen/Year:
No. of Beds Occupied/Year:
No. of Staff (FTE):

Type of Waste Expected:

Biomedical: No. of Bags Disposed/Week:
Type of biomedical waste (i.e. anatomical; other infections non anatomical):
How disposed:

Sharps: No. Disposed/Week:
Content Type (glass/plastic):
How Disposed:

Liquid Chemical: Types of Wastes:
Quantities:
How Disposed:

Figure 1 (Contd.)

Radiologicals: Types of Materials Used:
Quantities:
How Disposed:

Solid Waste: Types of Wastes Expected
Quantities:
How Disposed:

Confidential Shredding: Quantity Generated:
How Disposed:

Pharmaceuticals: Types Used:
Quantity Generated:
How Disposed:

Current Reduction, Reuse or Recycle Initiatives:

Possible Future Initiatives:

- Rubber boots
- Heavy duty rubber gloves
- Lap top computer to record data
- Javex and mops
- Sharps containers for any inappropriate wastes found
- Biomedical waste boxes for any inappropriate waste found
- Garbage carts to move the waste back and forth
- Air freshener!

Determine Sampling Period

Make explicit any assumptions that you intend to make about variability of waste generation. Our assumption at Ottawa General was that the main variability in total waste quantity would follow a 7 day cycle, with lower generation occurring on the week-end. We assumed that the composition of waste from individual activities would follow 24 hour cycles. Thus, we measured total waste generation rates over a 7 day period and did our waste composition (sorting) study over a full 24 hour period for each activity area. For the waste composition study, we found it necessary to sample every bag coming from a single section due to the high variability in the content between bags.

Meet with Housekeeping Staff

This is the most important meeting you will hold. It is essential that you understand how, when and where waste is picked up. It is also essential that you take the time to explain to the housekeeping staff the purpose of the audit and to solicit their help in tracking the waste and identifying from which area it is being generated. We were extremely grateful for the excellent help that we got at OGH from the housekeeping staff. For our study, we tried not to interfere with the regular activities of waste pick-up and, therefore, we recorded waste disposal procedures as they normally occur.

7.3 Determining the Total Waste Generated by Separate Hospital Activities

This is one of the two major tasks of the audit proper, the other being the characterization of the components of the waste as described in Section 7.5. Determining total waste quantities for the 6 general categories of waste defined in Section 4 are described below in 2 sub-sections. The first describes measuring wastes that are produced on a regular basis:

Clean General Waste
Biomedical Waste

The second sub-section describes measuring wastes that are generated on an intermittent basis:

Confidential Waste
Liquid and Chemical Waste
Radioactive Waste
Pharmaceutical Waste

7.3.1 Measuring the Quantities of Regularly Produced Waste

Regularly produced wastes can be measured directly. Both Clean General Waste and Biomedical Waste were measured this way. Our assumption is that waste generation for these categories varied over a 7-day cycle. Measurements were taken for a full 7-day period to ascertain daily variability.

During the pre-audit, building plans should have been clearly marked to show where each activity to be audited occurs. Initial meetings have already been held with housekeeping staff so they have got to know the waste audit team and understand what the audit is trying to achieve.

A much more detailed meeting needs to be held at this point in the audit to understand exactly which Housekeeping runs services, which areas

and when during the day wastes are picked up. A system should then be developed to label all bags being picked up by Housekeeping in order to identify its source. In the method used in the OGH study, coloured adhesive tapes were marked with run numbers (or sub run numbers where multiple activities were served by a single Housekeeping run). These labels were attached by the Housekeeping staff to green garbage bags, biomedical waste bags or buckets and sharps containers picked up on their runs. At OGH, waste is delivered to an area near the receiving dock. "Red bag" or anatomical waste goes to refrigerated storage prior to being shipped off-site for incineration. Infectious non-anatomical waste, i.e. sharps containers and lab wastes, are autoclaved, then disposed of with the green garbage bag waste into a 40-yard compactor trailer. The final waste handling at other hospitals may be different, but hopefully, all waste will, at some time, be available in a limited geographic area.

A weigh scale should be set up in the waste disposal area, and, as each labelled bag is delivered to this area, it is weighed and the origin and weight of the bag recorded. It is strongly recommended that the data be entered directly into a portable computer at large hospitals to avoid the tedium of having to transcribe data at a later date. This activity requires two people for a large hospital and, in the OGH situation, waste was delivered to the disposal room from 8 a.m. to 12 p.m., so two people were required for 16 hours/day. Some waste is delivered between midnight and 8 a.m., but this is generally in sufficiently small quantities that it can be set aside for weighing first thing in the morning. For the first day or two, members of the waste audit team should accompany Housekeeping staff for part of their runs to understand where the waste is being picked up and to answer any questions they might have.

After the bags and other containers have all been weighed and recorded, they are then disposed through the appropriate route. Anatomical and cytotoxic wastes go to storage for incineration; green bags go directly to the compactor. Infectious non-anatomical waste is autoclaved, then goes to the compactor.

Some departments may bring waste directly to the disposal area. This may be materials like food waste, old corrugated cardboard boxes (not bagged), plastic pails, etc. Try to find out where these wastes come from when they are delivered. In the study at OGH, less than 5% of the total waste measured was unlabelled and had to be reported as coming from unknown origin.

The results of all of this auditing are used in two ways: first, to partially construct the bar graph shown in Figure 2, which summarizes waste disposed on a regular basis; second, to determine the weight of the general and biomedical waste streams by activity over the full week period. Measurement of components of the total waste by activity is discussed in Section 7.5.

Figure 3 shows the variability of total waste generation throughout the entire hospital by four different sections:

Patient Care
Patient Services
Laboratories
Administration and Support Services

Variability over the seven days is much greater in the latter 3 major activity areas than in the Patient Care area.

As a check of these data on total waste generation, the total weight of that which is landfillable should be compared with waste hauler records for the period during which measurements were made, as seen in Figure 4. The data for biomedical waste, in this case anatomical and cytotoxic waste, should be checked against records of materials going to incineration (as in Figure 5), and on-site autoclaved non-anatomical wastes can be checked against autoclaving records (Table 12). In Figure 5, data for OGH anatomical waste and cytotoxic waste disposal over the year were obtained from a combined source of information.

Figure 2. Ottawa General Hospital Solid Waste Composition for week sampled (Sept. 28 - Oct. 5, 1990)

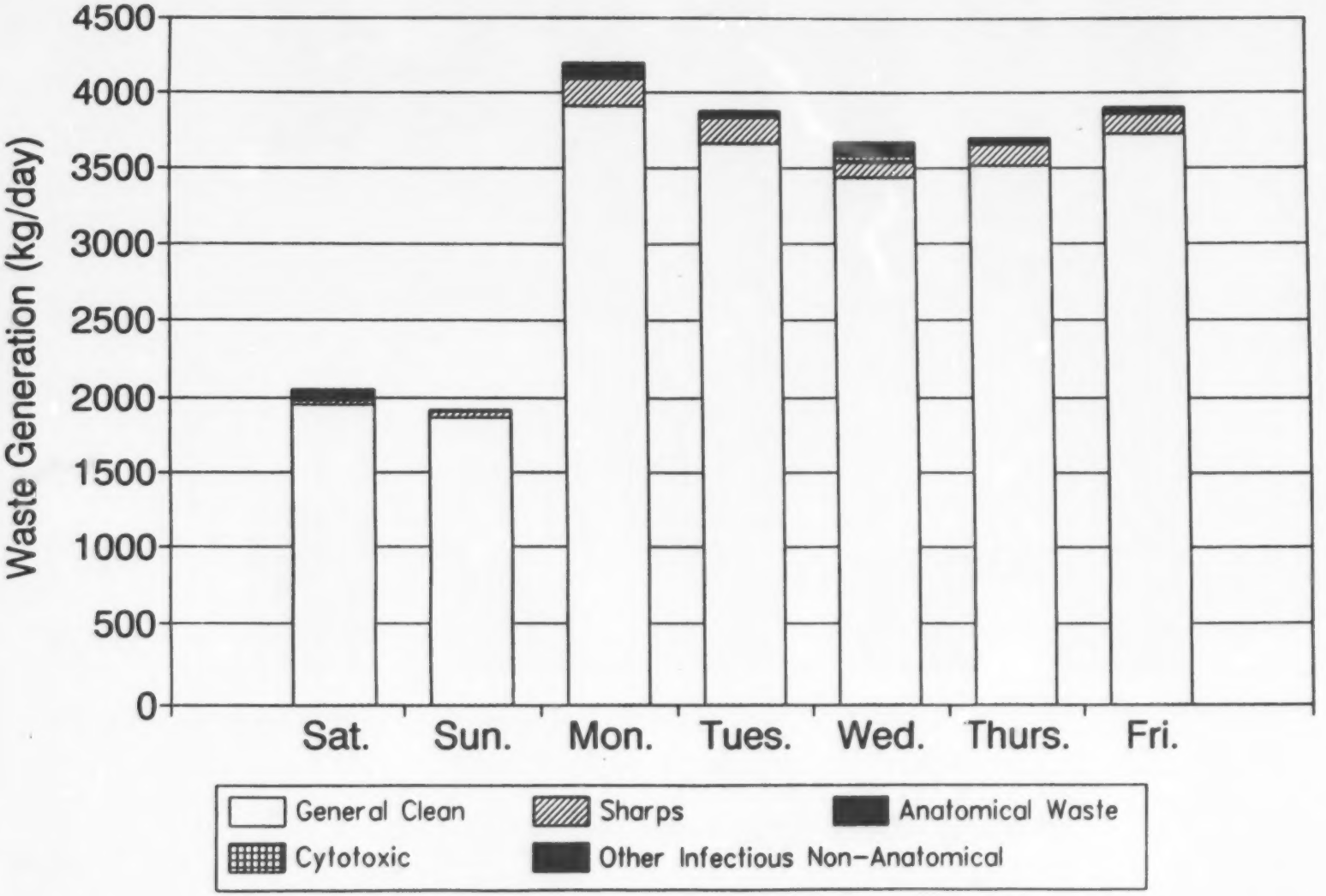


Figure 3. Seven Day Solid Waste Generation by Area of Activity for OGH

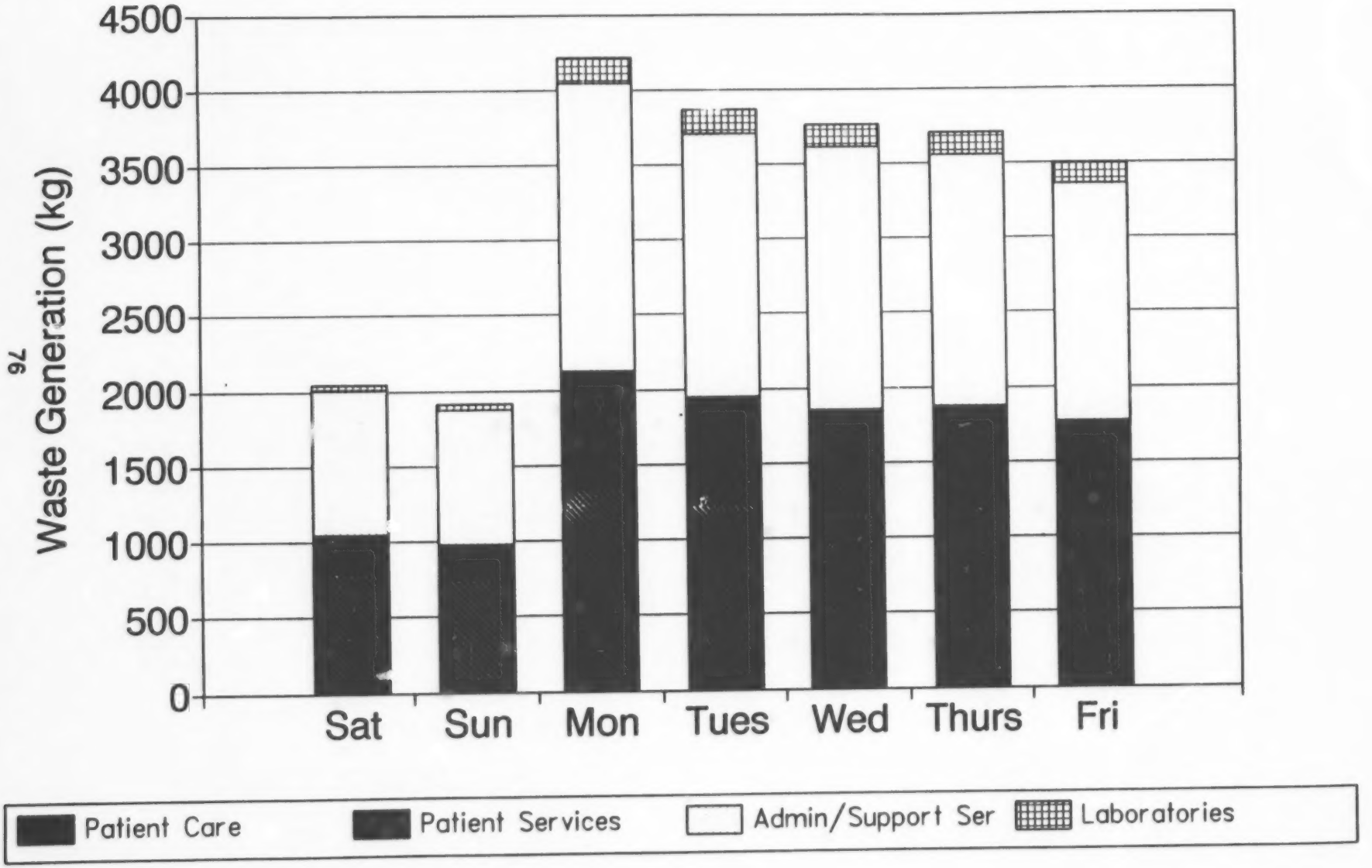
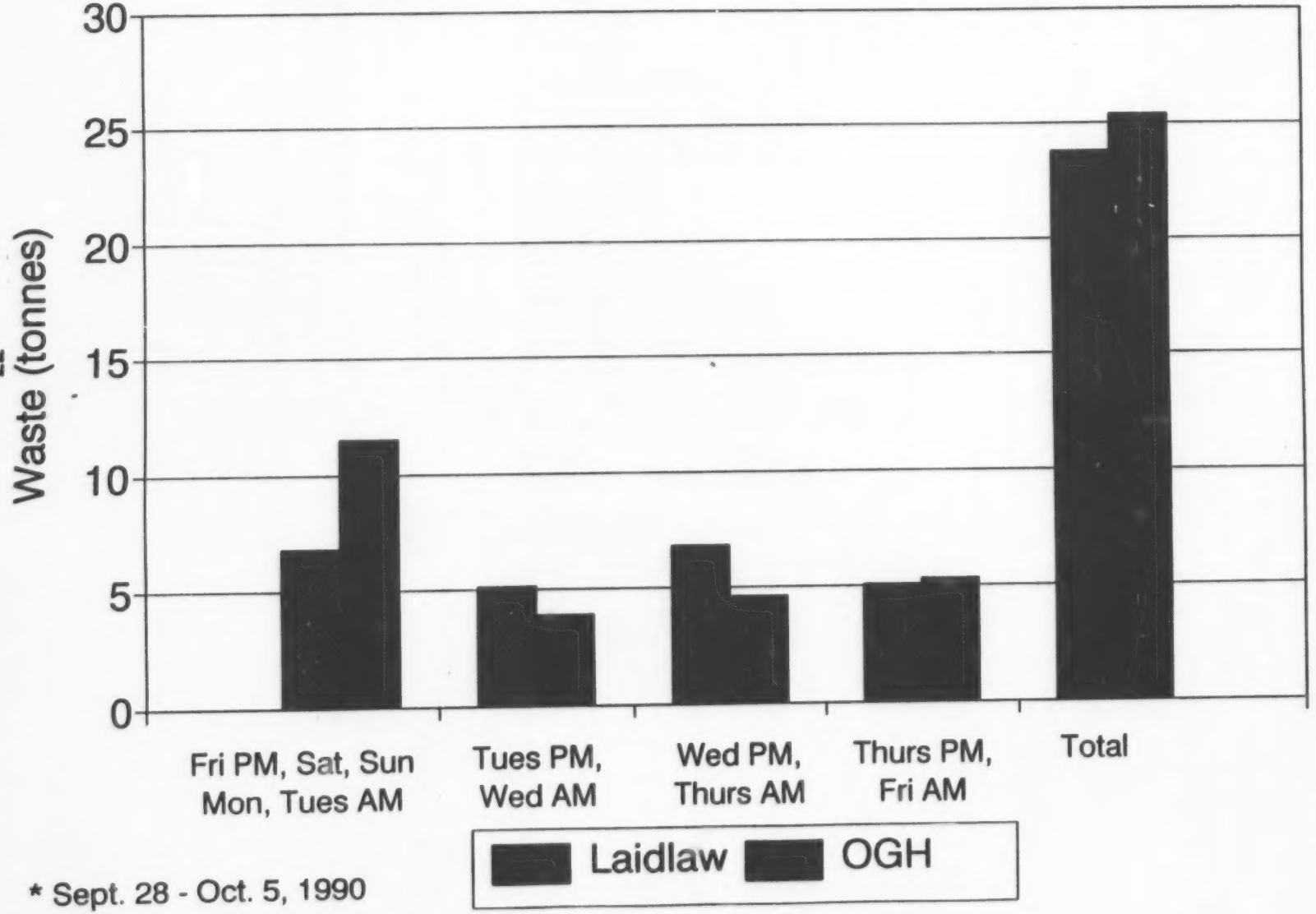
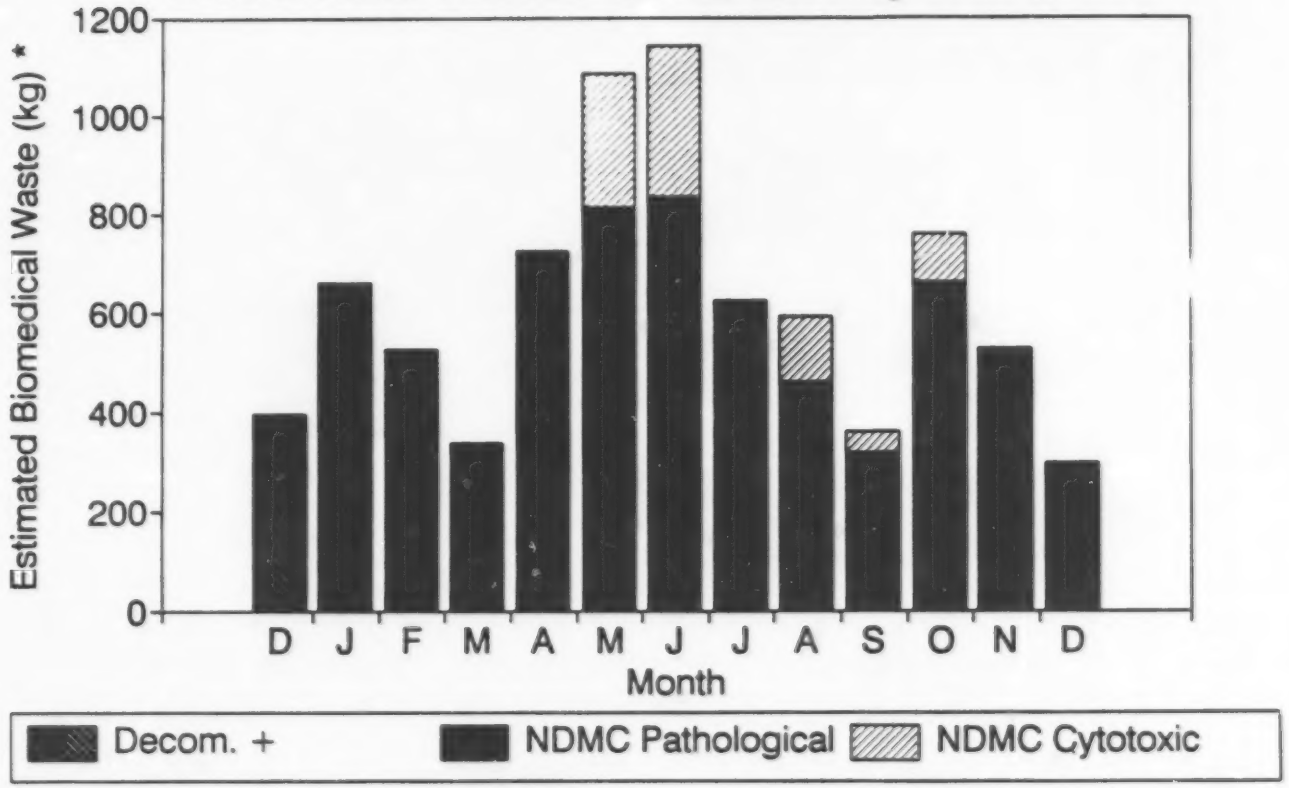


Figure 4. Comparing Solid Waste Generated from the Week * Sampled with Data Obtained from the Waste Hauler



* Sept. 28 - Oct. 5, 1990

Figure 5. Incinerated Cytotoxic and Anatomical Wastes Generated by OGH,1990



+ Includes Pathological and Cytotoxic

* Individual bag weights averaged 11kg
True weights difficult to determine for the whole year due to a lack of available data

Data for wastes incinerated at a local public facility show number of bags incinerated. An average weight per bag of 11 kg (based on measurements made) was used to estimate weights. For wastes shipped off-site to a commercial incinerator, manifest records show kg waste shipped.

Infectious non-anatomical waste quantities measured were compared to randomly selected single weeks from other months. In general, biomedical waste generation in both categories analyzed were lower in the late summer, which is a high vacation period.

A check on the "typicalness" of the week sampled should be made. Information should be sought about items such as high or low rates of emergency casualties, occupancy , vacations, and unusual maintenance, construction or repair activities. Another good check can be made by comparing waste disposal records for the week sampled with weekly data over the past year (see Figure 6). The week sampled at OGH seemed to be quite typical from these checks. Comparison of waste generation data at OGH throughout the year did not show great fluctuations. The sampled weeks are, therefore, representative of the facility for the whole year. Unfortunately, you may not know if the week you have sampled is a "typical" week until you have completed your sampling and evaluation. If there are situations which distort your average typical values, see if these can be measured and make adjustments to your values. If not, you may have to repeat your measurements at another time.

7.3.2 Estimating Quantities of Waste Produced Intermittently

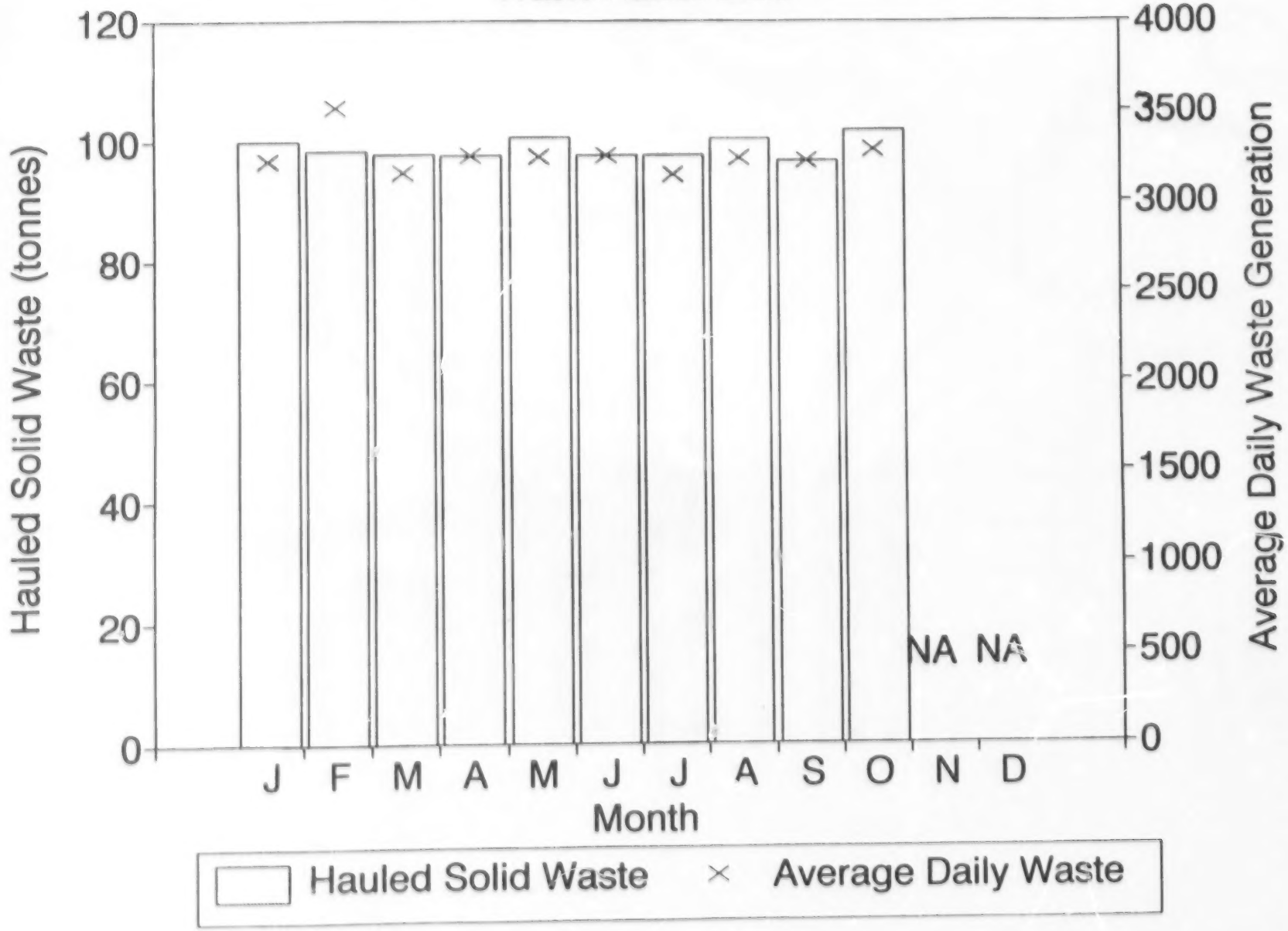
Several wastes are disposed on an intermittent basis: e.g.

Confidential Waste
Liquid and Chemical Waste
Radioactive Waste

TABLE 12 - Total Weekly Autoclaved Wastes: Comparing Waste Material Measured with Autoclave Records

Month, 1990 (per randomly Selected Week in the Month)	Total No. of Sharps Containers	Total No. of Autoclaved Bags
April	412	59
May	404	55
June	501	75
July	459	58
August	418	41
September	445	55
Average	440	57
October (sample week Sept 28-Oct. 5)	475	64

Figure 6. OGH Solid Waste Generation Based on Waste Hauler Data



Pharmaceutical Waste
Other Wastes, e.g. spill clean-up, seasonal yard waste, etc.

Because of the intermittent nature of the disposal of this waste, it is not practical to consider auditing its disposal directly. Some examples of intermittently produced wastes are shown in Table 13 and in the Hospital Waste Audit Manual. The confidential waste is reasonably easy to quantify as a whole for the hospital over a year period by obtaining records from shredding companies who perform this service, or to estimate quantities shredded on-site. Quantities generated by OGH over a year are given in Table 17 (see Section 8). It is difficult to accurately assign this to specific activities. It is not really very important to do so, because an infrastructure already exists in the hospital to segregate and collect this material. The task now is to look for ways of recycling rather than disposing the shredded paper, if this is currently not happening.

The other wastes can be estimated semi-quantitatively by searching a number of clues, including:

- Purchasing data
- WHMIS data
- Laboratory records
- Hazardous waste disposal manifests
- AECB licences and disposal records
- Conversations with individuals in areas generating the waste.

Ideally, these data should be completely quantified. However, the amounts of these wastes are extremely small compared to the wastes which can be well quantified by the audit.

The concern with liquid, chemical, radioactive and pharmaceutical wastes is more to ensure proper handling and disposal than to expect that reduction of these wastes will result in significant diversions of waste from disposal.

TABLE 13 - OGH Miscellaneous Intermittently Produced Waste for One Year

Materials	Use	Quantity	Individual Wts kg	Total Weight kg/yr	Disposal
Batteries	Flashlights, instruments etc.				Solid Waste
8.4 v		4			
Manganese	AAA	6,672	0.011	73.392	
	AA	98,832	0.023	2,273.0	
Alkaline 1	5 v (N)	6,120	0.008	48.96	
Mercury	4.05 v	36			
Alkaline C		22,260	0.066	1,469.16	
Alkaline	9 v	23,316	0.036	839.0	
Alkaline	1.5 v (O)	1,450	0.090	130.5	
Zinc Carbide	01.5 v	31,200			
Fluorescent Light Bulbs (4 ft long)	Lighting for whole hospital	300/yr replacement (building relamp every 3 yrs ~15,000 lamps)	0.27	81.0	Solid Waste
			0.27	4,050.0	Solid Waste
Landscaping Waste		Seasonally generated Done by outside contractors			Solid Waste Not included in OGH waste

The data on liquid, chemical and radioactive wastes are reported semi-quantitively in Appendix 3 and in Table 14. Table 15 is a blank version of the Table in Appendix 1 for you to use.

No unusual spill clean up waste or seasonal waste was observed in the audit of OGH. If such occurrences do occur during an audit, they should be measured and reported as a separate non-recurring item on the audit report.

Other solid wastes are produced on an intermittent or seasonal basis. Examples of these types of materials, as generated in OGH, are as follows:

- telephone books (recycled) generated 1 x year
- landscaping wastes (contractor disposes to own waste container)
- relamping of fluorescent light bulbs (under liquid and chemical wastes, 1 every 3 years)
- air filters (general waste and monitored during the sample week)

At the end of this part of the audit, we have a complete picture of the total amount of waste generated during a one-week time period divided into the general categories of waste defined in Section 4 and by the specific activity areas selected for the hospital. We do not have a breakdown of the specific components making up the clean general waste category which accounts for over 90% of the total waste generated. This is the next step in the audit.

TABLE 14 - Radioactive Material Usage and Disposal at OGH per year (1990)

Unsealed Sources		Actual Yearly Usage in Hospital (in G.Bq. unless otherwise marked)	Disposal Route
Technetium	TC 99	3,330.0	On-site decayed materials as per AECB requirements and sent for disposal as follows:
Iodine	I 131	83.0	
Chromium	Cr 51	0.15	
Cobalt	Co 57	9.2 M.Bq.	(1) general solid waste
Cobalt	Co 58	4.7 M.Bq.	(2) liquid waste to sewers
Gallium	Ga 67	24.0	(3) incinerated with solvent waste
Phosphorus	P 32	0.5	
Thallium	Tn 201	22.0	(4) administered to patient whereby internal decay takes place or some radioactivity is emitted as human waste
Tritium	H 3	0.37	
Carbon	C 14	-	
Iodine	I 125	0.54	
Iodine	I 123	1.7	
Indium	In 111	0.28	(5) containers sent back to suppliers
Sulfur	S 35	-	(6) returned to supplier if unusable
Sealed Sources			
Gadolinium	GD 153	55.0 G.Bq.	Via University of Ottawa to AECL accepted secure disposal site Disposed every 2 yrs

Other Sources to Note

Sealed sources must be removed from equipment at hospital before equipment can be disposed or recycled.

TABLE 15 - Liquid and Chemical Wastes Generated Per Section

Hospital Activity(1):

	Material	Use	Quantity/year	Container Type	Disposal
Section(2)					

(1) Patient Care
Patient Services
Laboratories
Administration
Support Services

(2) e.g. Obstetrics
Nuclear Medicine
Histology
Purchasing
Cafeteria

7.4 Relating Solid Waste Generation to Activity Levels

All of the work described in Sections 7.1 - 7.3 audits the solid waste generated by different activities in the hospital and, totalling this, gives the total waste generated by the hospital. The total amount of solid waste generated by each activity was measured over a one-week period. The specific components of the waste stream measured as a percentage of total waste generated by each activity area was determined from a 24-hour sample. Kilograms of each component generated by each activity over a one-week period is determined by multiplying the total waste generated by the activity by the appropriate percentage for the component of interest.

In order to add in intermittently produced waste, it is felt that reporting is more appropriately done on an annual basis, so that all results are reported as tonnes or kg per year. This is arrived at by multiplying the measured waste generation by 52 on the assumption that the week sampled is typical.

For a number of reasons, it is felt that it is very useful to relate the data obtained to Activity Levels in the specific activity areas. This allows for comparison with other health care institutions and it allows for updating of waste generation data if activity levels change within an individual hospital.

For each activity, an Activity Factor is chosen. For patient care areas, this could be number of beds occupied per year, per section. For laboratories, the factor could be number of samples processed per year. For Clinics, it could be number of patients served/year and, for Administration areas, it could be number of staff. Activity factors chosen for OGH are shown in Appendix 2.

For each activity factor, an activity level needs to be determined. This is worked out from available records or by interviewing staff in each activity area.

As an example, for the Orthopedics area of patient care, there may be 40 beds dedicated to this activity and records show that these are occupied an average of 99.4% of the time. If the number of beds occupied per year is chosen as the Activity Factor, the activity level would be 40 beds x 99.4/100% = 39.8 beds occupied on a yearly average.

The data on waste generation detailed in Appendix 1 is then reduced to values of kg/year/activity factor in Appendix 2.

Waste generation in the Orthopedics area was reported as 14,281 kg/year, which would be reported in Appendix 2 as 14,281 kg/year divided by 39.8 occupied beds = 359 kg/year per bed occupied.

All of the data reported in Appendix 2 are these specific waste generation figures, both for the components and total waste from individual hospital activities.

It is really only useful to do this at the specific activity level as all hospitals have different mixes of component activities. As a gross comparison, however, consideration could be given to comparing hospitals' overall waste generation based on a Total Waste generated per year per bed. For OGH, this figure is about 2.1 tonnes/year/bed:

23,400 kg/week x 52 wks/year x 93/100% occupancy ÷ 529 beds

= 2,100 kgs/bed/year

= 2.1 tonnes/bed/year

7.5 Determining the Specific Components of the Clean General Waste Stream

The first task is to define a list of components that are expected to appear in the clean general waste stream. These are listed in Table 16. Where possible and appropriate, the materials were divided into 2 categories: Potentially Recyclable and Probably Not Recyclable under current market conditions.

TABLE 16 - Specific Waste Materials Categories

Material	Current Market Status	Specific Categories	Examples Where Appropriate
Paper	Potentially Recyclable	Boxboard (BOX)	
		Computer printout (CPO)	
		Fine Paper (Fine)	
		Kraft Paper (Kraft)	
		Newspaper (News)	
		Old Corrugated Cardboard (OCC)	
	Probably Not Recyclable	Diapers	(Ongoing pilot projects in some hospitals)
		Incontinence Underpads	
		Medical Sterile Packaging	Syringe packages, generally laminates of plastic & tissue
		Miscellaneous Paper	Window envelopes, waxed milk cartons, laminated material such as pharmaceutical containers (paper & plastic)
		Hair and Foot Covers	Could be either paper (rayon) based or synthetic
		Wet Paper and Gauzes	Paper towels from washrooms, gauzes from patient treatment which can be paper (rayon) blend
Plastics	Potentially Recyclable	Film Packaging	Plastic bags and other film (i.e. shrink wrap)
		Food and other Container plastics	Juice bottles, individual server cups, plates, cutlery
		Polystyrene Food Containers	Foam cups, plates, bowls and clam shells
	Probably Not Recyclable	Medical Plastics	Disposable procedural trays, IV bags, dialysis containers, tubing, medical liquid containers, utensils
		Gloves	Disposable latex and PVC gloves

Table 16 (Contd.)

Material	Current Market Status	Specific Categories	Examples Where Appropriate
Glass	Potentially Recyclable	Clear Container	Baby formula containers, juice bottles
		Amber Container	Solvent bottles or other chemicals
	Probably Not Recyclable	Clear Borosilicate Amber Borosilicate	Pharmaceutical material containers
Metal	Potentially Recyclable	Food Metal	Aluminum food pans, pop cans, soup or other food cans
		Medical Metal	Disposable utensils
Food Waste	Potentially Recyclable	Food Waste	From cafeteria, decontamination area and from other areas throughout the hospital
Liquids	No Markets Considered	Blood	Contaminants found primarily in plastic containers
		Food	Contaminants found primarily in glass, metal and plastic containers
		Urine	Contaminants found primarily in plastic sample containers
Miscel-laneous	No Markets Considered	Personal Items	Shoes, hair brushes (probably brought in by patients, staff or visitors)
		Miscellaneous	Could range from hair, lint, batteries, coat hangers

In carrying out an audit, individual health care facilities may wish to change some of the components considered, combining some of those used at OGH, or expanding others if heavy usage of specific items make it appropriate to have this item as an individual component.

To undertake the audit of specific waste components, a waste sorting area needs to be set up. An indoor heated area is required, where, if possible, several tables are set up to do the sorting of individual clean general waste bags. The tables should be covered in waterproof tarpaulins that can be easily cleaned and disinfected. Other equipment required for sorting is listed in Section 7.2.3.

An excellent idea is to have the hospital infection control staff inspect the sorting area and the protective equipment to be used, and to give a talk to the sorting staff about precautions to be taken in handling waste. At the same time, the infection control people can outline concerns about items that might be inappropriately included in the general waste, e.g. sharps, body fluids, etc., whose proper placement should be in biomedical waste containers. Another wise precaution is to have all staff members who are involved in sorting immunized for hepatitis and any other potential infection recommended by Infection Control.

The assumption underlying the measurement of waste stream components is that the variability cycle is a 24-hour cycle. While volumes of waste in individual areas may vary over a 7-day cycle, the components from each individual activity will be the same each day.

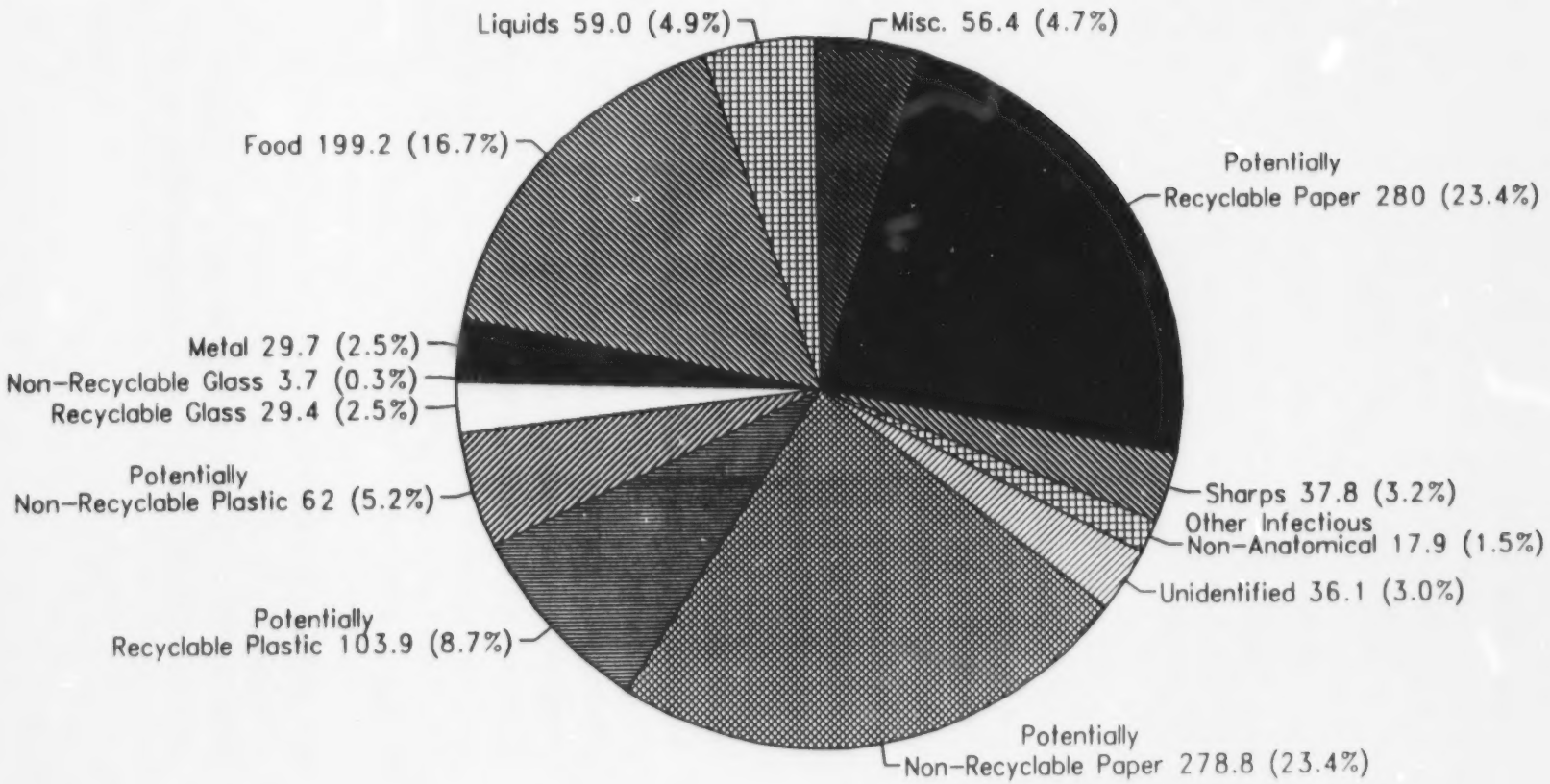
So, for each individual activity area, arrangements need to be made with housekeeping staff to collect all the waste from that individual activity area for all pick-ups during that day and to have that waste delivered to the Waste Sorting Area. Depending upon the volume of waste involved, several activity areas can be sorted in each day. It is likely that 4-5 people for a 2 to 3 week period will be required to sort components from every activity area in a major hospital.

As the bags arrive at the sorting area, note is made of collection time and specific activity area. Each bag is weighed, then very carefully opened and sorted into the components established. The individual components are then weighed and recorded. Notes are also made of any major contaminants associated with the individual components, e.g. body fluids or medical liquids in containers or tubing, excessive blood on gauzes, etc. Any biomedical waste or sharps appearing are also noted and should be reported to Infection Control. It is once again recommended that a portable computer be used to record data as wastes are being audited to minimize the time spent on data entry, after the auditing procedure.

Sorting is repeated for all activity areas until this task is complete. At the end of this activity a complete picture of the specific components of all regularly generated Clean General Waste collected in green garbage bags will have been generated. Clean general waste, at OGH, represented ~ 76% of the total waste stream.

Total waste disposed of by material categories will be of interest to the health care facilities when trying to determine potential waste reduction, reuse and recycling opportunities. Figure 7 shows a pie chart of General Solid Waste Materials disposed of at OGH as determined by our study. This includes general waste quantities currently disposed to landfill including items such as sharps after on site decontamination). Estimates of blood and body fluids were obtained from our detailed waste sorting procedure and do not include blood and body fluids which have been sewered or disposed of with biomedical wastes. Total waste quantities based on a per week calculation were converted into yearly data by multiplying all values by 52 weeks/year to arrive at the data given in Appendix 1.

Figure 7. General Solid Waste Material Disposed of at OGH (tonnes/year)



Parallel to this activity, others on the waste audit team should be investigating other components of the waste streams. These include:

- Regularly generated general wastes not in green garbage bags delivered directly to the compactor room (~ 17% of waste)
- Biomedical waste/sharps containers (~ 6% of waste)
- Wastes produced on an intermittent basis, e.g.:
  - Confidential waste (~ 1% of waste)
  - Liquid and chemical waste
  - Radioactive waste
  - Pharmaceutical waste

Identifying the components of the non bagged general waste is very easy and the data are available for a 7-day period, as it is weighed as part of the waste going to the compactor room. The difficulty with this waste is in identifying which activity area generates the waste. Over 70% of this waste is cardboard, the majority of which comes from 2 or 3 activities. Investigation during the audit located the source of the majority of the waste going directly unbagged to the compactor room.

For the biomedical waste, the identification of the activity area generating the waste was captured as part of the waste labelling scheme. For safety reasons, the components of the biomedical waste were not determined by sorting. Qualitative assessments of probable components were made by inference from the kinds of activities being conducted in the specific generating areas, (e.g. for sharps containers: laboratory sharps containers are likely to contain mainly glass, while those from patient care will be mainly needles and disposable plastic syringe bodies).

For intermittently produced wastes, these are investigated and measured as described in Section 7.3.2. There is difficulty in both accurately identifying components and, in some cases, like the confidential waste, in determining exactly which activity generates these wastes.

8. RESULTS OF OTTAWA GENERAL HOSPITAL WASTE AUDIT

The results of the detailed waste audit at Ottawa General Hospital are summarized in this section. The study was conducted on-site in 3 phases:

(1) identifying generating areas and bulk waste quantities over a 7-day period: September 28-October 5, 1990;
(2) measuring specific clean general waste material components: November 19-23, 1990;
(3) identifying other waste material categories, quantities and generating areas: December 10-14, 1990.

The audit team used the general audit approach as discussed in Section 7.

8.1 Waste Quantities

OGH produced 6 distinct waste types, as follows:

Clean general waste
Confidential waste
Biomedical waste
Liquid and chemical waste
Radioactive waste
Pharmaceutical waste

The proportion of each is given in the chart shown as Table 17, Summary of Annual Waste Generation Rate by Waste Type for Ottawa General Hospital (where generation equals waste recycled and disposed).

An analysis of the origin of the waste within the facility by the 4 hospital sections is given in Table 17. The table shows that the highest waste generating area is Admin and Support which accounts for almost 40% of the total waste.

TABLE 17 - Summary of Annual Waste Generation* Rate by Waste Types for Ottawa General Hospital
kg/yr; %

Sections	General Waste		Confidential Waste *1		Biomedical Waste *2		Registrable Chemical Waste *3		Radioactive Waste		Pharmaceuticals Waste *4		Total Waste	
	kg/yr	%	kg/yr	%	kg/yr	%	kg/yr	%	kg/yr	%	kg/yr	%	kg/yr	%
Patient Care	335700	29.1			15699	23.8					301	32.9	351700	28.5
Patient Services	4800	16.0			9784	14.8					614	67.1	195198	15.8
Laboratories	38000	3.3			28163	42.6	2050		< 2				68213	5.5
Admin/Supp.	510100	44.2			1976	3.0							512076	41.5
Exterior/External	22400	2.0			1934	2.9							24334	2.0
Unknown	61800	5.4	12400		8426	12.9							82626	6.7
Totals	1152800	100.0	12400	100.0	65982	100.0	2050	100.0	< 2		915	100.0	1234147	100.0
Generation of waste type *6 (kg/bed/year)	2179.2		23.4		124.7		3.9				1.7		2332.9	

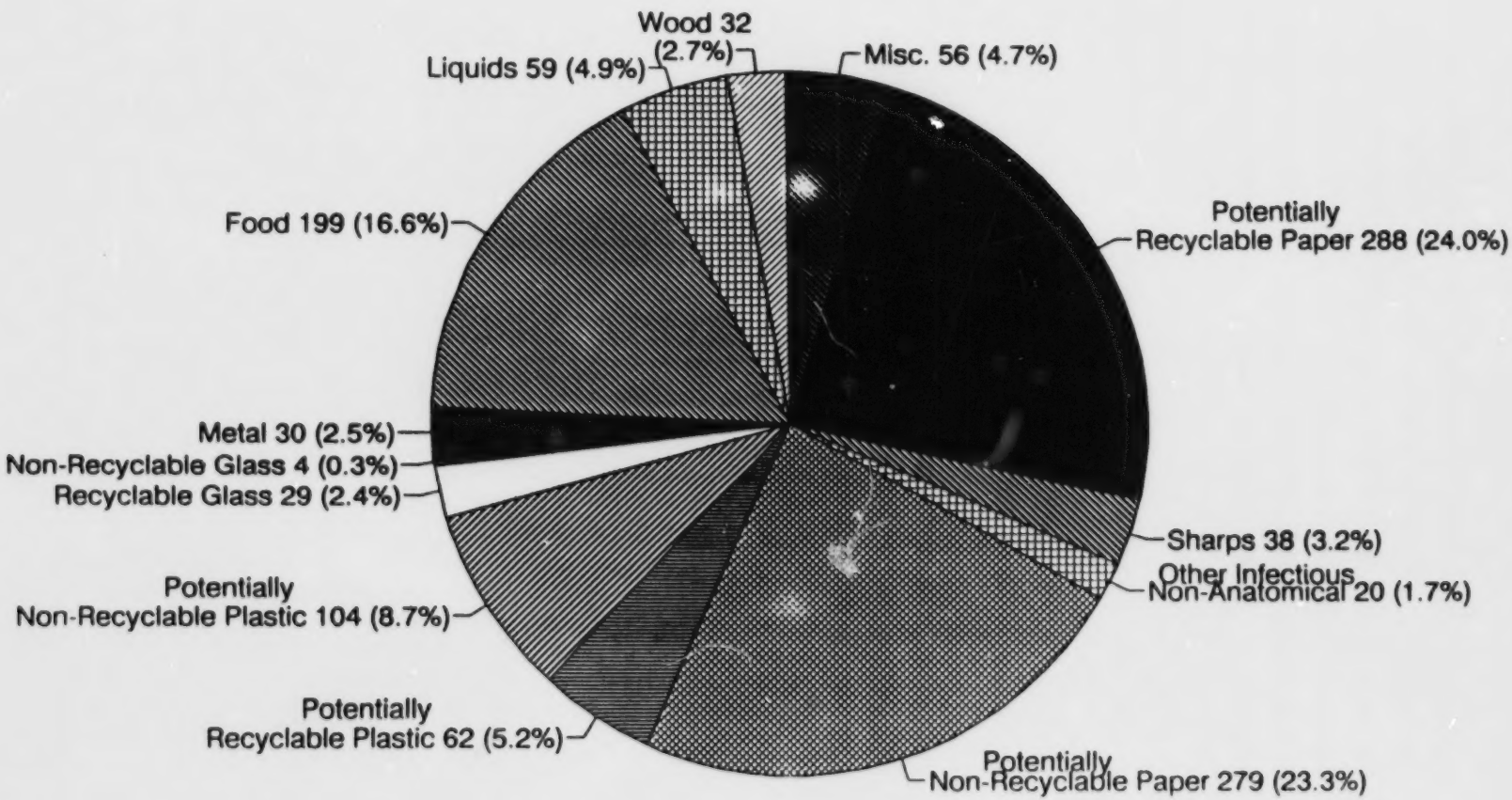
* Annual Waste Generation = waste disposed + waste recycled
*1 Includes confidential material stored and shredded by contractor; does not include currently on-site shredded waste which is minimal
*2 Includes all biomedical wastes: anatomical and non-anatomical infectious wastes (1) sharps, (2) laboratory, (3) blood and body fluids
*3 Does not include other liquid wastes currently sewered on-site; this figure represnts solvent waste (2050 kg)
*4 Includes only cytotoxic waste, does not include administered drugs, narcotics, etc. that have not been used and must be disposed
*5 Adjoining building disposes of some waste at OGH
*6 Where OGH has 529 beds occupied per year

The largest single waste component is the clean general waste sector. This waste stream makes up 95% of the total waste generated. Separate waste material component analysis in this component revealed the waste composition as shown in Figure 7 (presented previously). This pie chart reveals that paper and paper related products are the single largest component of the hospital waste stream at 47.2%, food wastes at 16.6% are the second largest component, and plastics at 13.8% are third. Figure 8 shows the total solid waste generated by OGH (as disposed plus recycled) and the breakdown of each material section.

Details on current reduction, reuse and recycling activities were noted previously in Tables 9 and 10.

Full details of general waste generation rates by components for the Ottawa General Hospital are given in Appendix 1. Semi-quantitative data for Liquid and Chemical Waste Generation are given in Appendix 3.

Figure 8. General Solid Waste Material Disposed and Recycled at OGH (tonnes/year)



9. WASTE REDUCTION, REUSE AND RECYCLING OPPORTUNITIES

There is a generally recognised hierarchy of approaches to waste management:

Waste Reduction:	Not making waste in the first place
Waste Reuse:	Reusing the waste where acceptable
Waste Recycle:	Reprocessing waste to recover values from the waste
Waste Treatment:	Safely treating wastes which cannot be recycled
Waste Disposal	Disposing of residues safely

While waste reduction may be the ultimate goal, any movement that a hospital can make up the hierarchy away from disposal is beneficial environmentally. How far toward reduction a hospital can move will be governed by considerations of efficacy of products, health and safety of patients and health care workers, and economics. For each major waste category generated by a hospital, consideration should be given to how practical waste reduction, reuse or recycle might be.

Figure 8 (presented previously) gives a general idea of what kinds of waste could be disposed as general wastes by similar types of hospitals. It includes estimations disposed and currently recycled and is expressed in % by weight. In Table 18, an evaluation of reduction/reuse and recycling "potential" is made for all of the categories of clean general waste produced in a hospital. The definitions of the evaluation of "potential" are given in Table 19. Similarly, Table 20 reviews the same potentials for biomedical waste generation, Table 21 for selected liquid and chemical waste generation and Table 22 for confidential paper wastes, radioactive wastes and pharmaceutical wastes found in hospitals.

TABLE 18 - Evaluation of Waste Reduction, Reuse and Recycling Opportunities for Clean General Wastes in Hospitals

Material Type	Reduction, Reuse	Potential		Recycling	Potential				Major Sources in Hospital
		Tech	Infras.		Internal Infras.	Transport	Technol	Markets	
Paper									
Boxboard	Ask suppliers to reduce packaging	3	2	Collect for recycle	2	2	2	2	All areas where supplies are delivered
CPO	Examine uses, reduce copies of reports, use electronic mail systems, ship reports on reusable disks	1	2	Collect & ship to recycler	2	1	1	1	Almost all areas majority from Admin
Office Paper	Reduce usage, electronic mail, examine need for reports, etc., circulate memos, double sided copying	1	2	Collect & sell to recycler	2	1	1	1	Almost all areas
News-paper	Unlikely to reduce			Collect & get municipality to collect in blue box	2	2	1	1	Almost all areas

Table 18 (Contd.)

Material Type	Reduction, Reuse	Potential Tech	Potential Infras.	Recycling	Potential Internal Infras.	Potential Transport	Potential Technol	Potential Markets	Major Sources in Hospital
OCC & Kraft	Ask suppliers for reusable totes	1	2	Collect, flatten or bale & ship to recycler	1/2	1	1	1	Admin/Supp. Serv.
	Suppliers to reduce quantity of OCC	3	1						
Adsorbent Paper	Switch to reusable Reduce usage - judicious use of underpads, reexamine need for incontinence in non ambulatory patients	1	2	Compost	2	2 off-site - on-site	2	2 off-site 1 on-site	Admin/Supp. Patient care Patient Serv.
Wet Paper Gauzes	Examine uses, reduce where possible	3	2	Compost	2	2 off-site - on-site	2	2 off-site 1 on-site	Patient care Patient Serv.
	Investigate hot air dryers in washrooms or reusable cloth rolls	1							
Other	Examine all uses of packaging, ask suppliers to reduce	3	3	Compost if materials are deemed suitable - low inorganic ink content, etc.	2	2 off-site - on site	2	2 off-site 1 on-site	All areas

Table 18 (Contd.)

Material Type	Reduction, Reuse	Potential		Recycling	Potential				Major Sources in Hospital
		Tech	Infras.		Internal Infras.	Transport	Technol	Markets	
Food & Food Wastes	Prepare menus as accurately as poss. to reduce wastage	1	1	Undesirable but still consumable - send to food banks	1	1	1	1	
	Prepare foods that are desirable by patients, customers to reduce wastage	1	1	Food from preparation area. Send for animal feed	1/2	1	1	1/2	
	Eliminate disposable use in Cafe. & patient care food services	1	3	Compost	2	2 off-site - on-site	2	2 off-site 1 on-site	Support area Minor amounts from other areas
Plastic									
Food Plastic	Reduce use if possible	1	3	Collect separately, ship to recycler	3	2	1	1	Admin/Supp.
Film Package	Examine all uses, eliminate where possible	1	3	Collect separately, ship to recycle	3	2	1	1	Most areas, high in Admin/ Supp. areas
Poly-styrene	Eliminate foam cups, etc., ask suppliers not to ship in P.S. Peanuts	1	2	Collect separately, ship to recycler	3	2	1	1	Admin/Supp.

Table 18 (Contd.)

Material Type	Reduction, Reuse	Potential Tech	Potential Infras.	Recycling	Potential Internal Infras.	Potential Transport	Potential Technol	Potential Markets	Major Sources in Hospital
Plastic (cont'd)									
Medical Plastics	Examine all procedures using disposable plastics to determine which can be changed	3	3	Collect different polymers separately, ship to recycler	3	2/3	1	1	Patient Care Patient Serv.
Gloves	Unlikely to substantially reduce because of safety, examine whether single type of glove can be used throughout hospital			Collect PVC gloves separately, ship to recycler.	3	2	2	2	Patient Care Patient Serv. Laboratories
				latex gloves				3	
Glass									
Food Cont. Glass (clear)	Investigate other container systems or bulk shipments	1	3	Collect separately, get municipalities to pick up in blue box	2	2	1	1	Admin/Supp. minor amounts elsewhere
Amber Glass	-do-			Collect separately, (rinsing may be required), possible commercial pick up for recycle	2	2	1	3	

Table 18 (Contd.)

Material Type	Reduction, Reuse	Potential		Recycling	Potential				Major Sources in Hospital
		Tech	Infras.		Internal Infras.	Transport	Technol	Markets	
Glass (cont'd) Boro-silicate Glass	Encourage suppliers to investigate other container systems	2	3	no market (presently available	3	3	3	3	Patient Care Patient Serv. Laboratories
Metal									
Food Metal	Investigate other container systems of bulk shipments	1	2	Collect separately, Get municipalities to pick up in blue box	2	2	1	1	Admin/Supp. Minor amounts elsewhere
Medical Metal	Explore use of better quality instruments which are reusable, not disposable	1	2	Collect in place in commercial scrap metal recycling bin	3	2	1	1	
Wood									
Packag-ing (pallets)	Reuse pallets where possible, work with suppliers to take back	1	1	Work with pallet recyclers to pick up pallets (need to store on-site)	1-3	1-3	1	1	Admin/Supp.

Table 18 (Contd.)

Material Type	Reduction, Reuse	Potential		Recycling	Potential				Major Sources in Hospital
		Tech	Infras.		Internal Infras.	Transport	Technol	Markets	
Misc.									
Furniture and Equip-ment	If reusable, contact organizations who send materials to less privileged areas of the world for reuse	1	1	Computers and other electronic equipment may have metal recovery value	1	1	1	1/2	

TABLE 19 - Definition of Reduction, Reuse and Recycling Potentials

Reduction, Reuse/On-Site

Potential	Technology	Internal Infrastructure
1	Commercially applied	In place
2	Demonstrated minimal changes	Readily achievable,
3	Not demonstrated	Substantial change required

Reuse & Recycling/Off-Site

Potential	Internal Infrastructure	Transportation* Infrastructure	Technology For Recycle	Markets for Recycled Products
1	In place	In place	Commercially applied	Extensive
2.	Readily achievable, minimal change	Readily developed with suppliers	Demonstrated	Limited
3.	Substantial change	Difficult to develop	Not demonstrated	Non existent

*Will be very location dependent

TABLE 20 - Evaluation of Waste Reduction, Reuse and Recycling Opportunities for Biomedical Wastes in Hospitals

Material Type	Reduction, Reuse	Potential		Recycling	Potential				Major Sources in Hospital
		Tech	Infras.		Internal Infras.	Transport	Technol	Markets	
Anato-mical Wastes	Reduce non-anatomical materials in containers (i.e. packaging wastes)	1	1	Explore options for use as feedstock in pharmaceutial manufacturing (i.e. placentas)	2	2	2/3	2/3	Patient Serv. Laboratories
Infectious non-anato-mical	For large generating areas use larger sharps containers for collection	1	1	Explore sharp & sharp container recycling using new tech-nologies (for poly-propylene content)	1	2	2/3	2/3	Laboratories Patient Care Patient Serv.
Sharps	Reduce non sharp items in container (i.e. paper towels, gloves)	1	1						
Micro-biology wastes	Reduce non infectious waste items in containers	1	1						
Blood & Body Fluids	Reduce non blood & body fluids items in containers	1	1						

TABLE 21 - Evaluation of Waste Reduction, Reuse and Recycling Opportunities for Selected Liquid and Chemical Wastes in Hospitals

Material Type	Reduction, Reuse	Potential		Recycling	Potential				Major Sources in Hospital
		Tech	Infras.		Internal Infras.	Transport	Technol	Markets	
Solvents									
Aromatic Aliphatic Halo-genated	Reduce quantity used by developing micro procedures	1	1	Segregate solvent wastes, install on-site distillation equipment for recycling	1	N/A	1	1	Laboratories
				Use off-site commercial solvent reycling operations where quantities warrant	1	1	1	1	
Formalin for tissue preserv.	Use substitutes for temporary tissue preservation (i.e. cold physiological saline or other commercially available materials)	1	1						Laboratories
	Take smaller samples which require less preservative	1	2						

Table 21 (contd.)

Material Type	Reduction, Reuse	Potential		Recycling	Potential			Major Sources in Hospital
		Tech	Infras.	Internal Infras.	Transport	Technol	Markets	
	Reuse formalin from specimens by development of on-site filtering system to remove contaminents	3	3					
	Reduce formalin wastewater emissions by using additives to precipitate formaldyde from solution before discharge	1	1					
Formalin Used in disinfec-tion of dialysis equip.	Reduce quantity used by clearly establishing maximum concentrations & frequency of use	1	1					Patient Serv.

Table 21 (contd.)

Material Type	Reduction, Reuse	Potential		Recycling	Potential				Major Sources in Hospital
		Tech	Infras.		Internal Infras.	Transport	Technol	Markets	
	Replace formalin with less toxic materials commercially available	1	1						
Chloro-fluoro-carbon (CFC) in equip.	Replace high ozone depleting potential CFC12 with less harmful CFCs (i.e. CFC22)	2	2	Recycle CFCs which continue to be used by instructing contractor to do it; or purchase own recovery equipment	1	1	1	1	Admin/Supp. Serv.
Anaesthetic Gases				Capture and recycle anaesthetic gases via use of Delta 115 molecular sieve	1	2	2	2/1	Patient Serv.

Table 21 (contd.)

Material Type	Reduction, Reuse	Potential Tech	Potential Infras.	Recycling	Potential Internal Infras.	Potential Transport	Potential Technol	Potential Markets	Major Sources in Hospital
Sterilant Gases Ethylene Oxide/ CFC	Reduce quantity used by making sure units are full before using	2	2	Install capture & recovery technologies for Eto/CFC12 for as long as regulations allow	2	1	2	2	Admin/Supp. Serv.
	Reduce usage of materials requiring sterilization with ethylene oxide/ CFC12 by replacing with items which can be steam sterilized where available	2/3	2/3						
	Replace Eto/CFC12 sterilization with other technologies	2/3	2/3						
	Replace CFC12 as carrier with other materials	2/3	2/3						

Table 21 (contd.)

Material Type	Reduction, Reuse	Potential		Recycling	Potential				Major Sources in Hospital
		Tech	Infras.		Internal Infras.	Transport	Technol	Markets	
Misc. Waste organic & inorganic chemicals	Purchase smaller quantities to reduce prospect of expired quantities	1	1	Set up internal waste exchanges for lab chemicals which may be still useful to someone else	1	2	1	2	Laboratories
Mercury	Reduce mercury usage in hospital by using more electronic based equipment (e.g. thermometers)	1	1	Recycle waste mercury to rerefining companies	1	2	1	1	Support Serv.
	Reduce battery disposal by using rechargeables where suitable	1	1	Recycle batteries where markets warrant re silver, mercury, nickel	1/2	2	1	1	
	Use lower toxicity batteries, (I.e. zinc/air) where applicable	1	1						
	Reduce quantity of fluorescent lamps used in hospital by	1	1						

Table 21 (contd.)

Material Type	Reduction, Reuse	Potential		Recycling	Potential				Major Sources in Hospital
		Tech	Infras.		Internal Infras.	Transport	Technol	Markets	
	turning lights off where not required, evaluating lighting requirements								
	Purchase longlife light bulbs which require fewer changes	1	1	Keep up to date on new recycling markets for batteries and fluorescent lights					
Waste Oils	Investigate use of filters to extend life of oils	1	1	Recycle oils (i.e. vegetable or hydraulic) to commercial recyclers	2	1	1	2	Supp. Serv.
Petroleum Distillate	Investigate use of water based paints which do not require solvents for cleanup	1	1	If large quantities are available, then send to recyclers	2	2	1	2	Supp. Serv.
Photographic chemicals	Reduce spoilage of chemicals by using proper storage	1	1	Recycle photographic film for silver recovery at off-site recyclers	2	2	1	2	Patient Serv.

Table 21 (contd.)

Material Type	Reduction, Reuse	Potential Tech	Potential Infras.	Recycling	Potential Internal Infras.	Potential Transport	Potential Technol	Potential Markets	Major Sources in Hospital
	Photographic bath life may be extended by adding the necessary chemicals (requires extra time and analysis) Reduce wastewater usage with counter-current rinsing (requires extra space)	1	1/2	Recover silver from fixer solution using on-site machine or off-site commercial recovery operations	2	2	1	2	
Detergents Disinfectants	Reduce wastage by purchasing only what is required	1	1						Supp. Serv.
	Replace hazardous cleaning agents (i.e. phenols) with more benign materials where possible	1	1						

Table 21 (contd.)

Material Type	Reduction, Reuse	Potential		Recycling	Potential				Major Sources in Hospital
		Tech	Infras.		Internal Infras.	Transport	Technol	Markets	
Pesti-cides/ herbi-cides	Reduce quantity in application where possible	1	1						
	Replace with biological controls where possible	1	1						
Misc. Materials									
Waste Paints	Reduce hazardous wastes by replacing oil & enamel based paints where possible with latex paints	1	1	Paint recycling is becoming more popular. Investigate whether this service is offered in your area	1	2/3	1	1/2	Supp. Serv.
Sewered Macer-ated Food Wastes	Reduce quantity of suspended solids & Biological Oxygen Demand from being sewered by making sure macerators are operating efficiently	1	1						Supp. Serv.

Table 21 (contd.)

Material Type	Reduction, Reuse	Potential		Recycling	Potential			Major Sources in Hospital
		Tech	Infras.	Internal Infras.	Transport	Technol	Markets	
	Incorporate additional screens to capture more suspended solids	1	1					
Pressurized Cylinders	Purchase only cylinders that are returnable to suppliers	1/2	1					Supp. Serv.
Drums	Purchase chemicals in returnable drums	1/2	1					

TABLE 22 - Evaluation of Waste Reduction, Reuse and Recycling Opportunities for Confidential Shredded Waste, Radioactive Materials and Pharmaceuticals

Material Type	Reduction, Reuse	Potential		Recycling	Potential				Major Sources in Hospital
		Tech	Infras.		Internal Infras.	Transport	Technol	Markets	
Confidential Shredded Waste	Employ electronic information systems where possible	1	2	Use recyclable paper & shred material on-site for addition to on-site paper recycling program	1/2	1	1	1	Admin/Supp. Serv. & all over
				Have material shredded by contractor who recycles material for you	2	2	1	1	
Radioactive Materials	Reduce quantity of radioactivity by allowing for on-site decay	1	1	Request non radioactive outer containers as returnable/ recyclable materials & request supplier to take them back, i.e. Pb container or plastic containers, or send to commercial recycler	1	2	1	3	
	Reduce hazard of materials by employing materials with shorter half lives where possible	1/2	2						
	Return containers to suppliers								

Table 22 (contd.)

Material Type	Reduction, Reuse	Potential		Recycling	Potential			Major Sources in Hospital
		Tech	Infras.	Internal Infras.	Transport	Technol	Markets	
Pharma-ceuticals	Where out of use material may still be reusable, investigate for outside agency to take them Purchase only as required to reduce out of date material Reduce contact of packaging material, etc. with chemo-therapy waste to reduce the quantity requiring secure disposal Return outdated drugs to manufacturers	1/2	1					

9.1 Examining Opportunities for Reduction, Reuse and Recycle

The purpose of doing a waste audit is to understand what wastes are generated by what procedures, where in the hospital, so that consideration can be given to reducing the quantities of wastes generated or reusing and recycling components from the waste stream.

Describing waste reduction, reuse and recycling opportunities generically is very difficult, as they are very dependent upon procedures and purchasing practices, which vary from hospital to hospital, and recycling facilities where availability varies according to the location of the hospital.

What is described in this section is: (a) a general approach establishing priorities for the examination of 3Rs' opportunities; and, (b) some examples of opportunities from the audit conducted at OGH. It is important that the Environmental Committee become involved in reviewing the results of the audit in order to select appropriate waste minimization initiatives.

9.1.1 A General Approach to Establishing Priorities

There are 6 criteria to consider in establishing priorities for considering waste reduction, reuse and recycling initiatives.

(1) Is recycling of the waste regulated by provincial statute or by local municipal bans on material going to landfill, e.g. cardboard, wood, etc.?

(2) Is the waste generated in large quantity, so that reduction, reuse, recycle initiatives would make a significant impact on total waste diverted?

(3) Are there feasible opportunities for reduction, reuse and recycle that can be applied?

(4) Is a high proportion of the waste generated in relatively few areas of the hospital, thus making the establishment of internal infrastructure easier?

(5) Are there environmental enthusiasts in the department generating the waste?

(6) Is the application of 3Rs financially feasible?

These are each discussed briefly below.

Regulation

Waste reduction is becoming subject to regulation by several levels of government. For example, the federal government's National Packaging Protocol has established specific targets for packaging waste reduction which may result in regulations being put in place to achieve these guidelines, and restrictions on chlorofluorocarbon use are also imminent.

Provincial governments are also establishing targets for waste reduction and may have requirements of hospitals to segregate and recycle certain materials or packages. Some municipal governments have established landfill bans for materials that they deem to be recyclable.

You should check with your local municipality and province to understand which wastes are not permitted to go for disposal. These materials obviously must have a high priority when examining potential reduction, reuse and recycle opportunities.

Materials that may be included here are: old corrugated cardboard, fine paper, tires, drywall from construction, "blue box" materials such as food and drink cans and bottles, and newspapers, and CFCs.

Large Quantities

The largest single waste type generated by a hospital is general waste. Figure 8 (presented previously) gives a breakdown, by percentage, of material types making up the total waste generated by OGHin this category. Because you want to divert the maximum amount of waste from disposal, it makes sense to give priority to those wastes generated in large quantities in considering reduction, reuse, and recycling opportunities. Examples of large quantity materials are: (1) food, 16.6%; (2) potentially recyclable paper, 24%; and, (3) potentially recyclable plastics, 8.7%. Further analysis may prove that it is not possible to reduce these materials technically or economically, but it makes sense to give priority to examining potential for these large streams.

Feasibility of Reduction, Reuse and Recycle Initiatives

Tables 18, 20 and 21 (presented previously) are an assessment of how easy it might be to introduce reduction, reuse and recycle opportunities for specific material types. These Tables consider technology, infrastructure and markets in assessing how easy it might be to introduce 3Rs' approaches for various materials. Taking old corrugated cardboard as an example for reduction/reuse, Table 18 suggests two options: (a) reusable totes deemed technologically available today and which have a readily achievable infrastructure; and, (b) reduced quantities of material per cardboard box deemed technologically unavailable, but requiring no infrastructure change. For recycling of OCC, the Table suggests that infrastructure, transportation technology and markets are all potentially available today. Thus, OCC might be considered a readily reducible or recyclable material that hospitals should give high priority to considering for waste diversion.

Food waste, which is anoth - of the larger waste streams, is considered slightly less advanced in development of commercially appl ed reduction or recycling opportunities. In some areas, food waste reuse as an animal feed has been done, and even composting projects have been initiated.

Limited Distribution of Waste Generating Areas In the Hospital

Tables 18, 20 and 21, which address the efficacy of recycling approaches, also note the areas within the hospital that are major generators of these materials. This is defined more quantitatively in Table 11. This Table details, for each waste material, what proportion of this material is generated where in the hospital. For those materials where the majority of the waste is generated in relatively few locations, the introduction of reduction or reuse will involve fewer changes to operations and impact on fewer staff, and recycling will involve a much simpler collection infrastructure. Examples of wastes where the majority is produced in relatively few places are: food waste, 87% in support services; OCC, 50% in support services; and 20% miscellaneous, which is all delivered separately to receiving.

Environmental Enthusiasts

An essential part of successful waste reduction, reuse and recycle programs are enthusiastic people who want to make things work. Wherever you find such groups, you should consider programs for their areas.

Based on the evaluation of these first 5 issues, you can now detail which reduction, reuse or recycling programs you have identified as having priority for implementation at your hospital.

For Example, at OGH:

Material type:		Cardboard
Activity:		Recycling
Locations affected:	Support services:	Inventory and receiving
		Kitchen (dietetics)
	Patient Care:	Product delivery throughout the building
Estimate of Potential Diversion (calculation from Appendix I)		16[illegible]6 tonnes/yr

Once these potential programs have been established, the financial evaluation of programs selected should be calculated.

Financial Implications

For each selected potential reduction, reuse or recycling initiative, a financial analysis should be completed. It is important to compare the costs of a new initiative with current costs to ensure that the change makes economic sense. Should the new initiative have significant costs associated with it, you may wish to explore sources of funding and support through government programs, and suppliers, and get assistance to operate the program from volunteers or even ambulatory patients (i.e. psychiatry) who could participate in recycling collection or composting at the hospital.

Each facility will have its own unique issues when evaluating the financial implications. In most cases, the full "environmental cost" accounting has not yet been determined (i.e. disposable versus reusable diapers), but, in many cases, specific local environmental impacts may take a priority (i.e. in areas of acute water shortages, disposable diapers may be favoured).

Four examples have been provided which show how to calculate the financial implications of selected waste minimization initiatives and costs to your facility for the programs selected. Specific costs for recycling programs should be worked out in conjunction with a number of potential recycling companies, if available. For waste reuse programs, suppliers and service companies (i.e. laundries) need to be contacted for specific costs. For waste reduction initiatives, suppliers should be able to provide costing examples for you.

Once these cost calculations have been conducted, you will be able to select the appropriate waste management programs for your facility.

Sample Financial Calculations for Selected Recycling, Reuse and Reduction Initiatives

Example 1: Cardboard Recycling

OGH Data:

# of beds:	529
Total general waste disposed:	1,217 tonnes/yr
Type of container:	Compactor
Revenue from sale of cardboard:	0

Cardboard Waste Generation:

Cardboard disposed:	160 tonnes/yr
Kraft paper disposed:	2.04 tonnes/yr (kraft can be recycled with cardboard in small quantities)
Total recyclable:	162 tonnes/yr
% of total general waste:	13.5%

Estimated Current General Waste Disposal Costs:

Disposal cost/year (lift fee + disposal): (Other costs, such as labour, utilities to operate garbage room, etc., will not change significantly)	$72,800
Total General Waste Disposal Costs:	$72,800
Cardboard Waste Disposal Costs:	13.5% of general waste = $9,828

Recycling Option

(a) Manual Flattening

Estimated labour:	3 hrs to flatten 400 kg
∴ To flatten 162 tonnes requires:	1,215 hrs
Estimated labour costs:	$12/hr x 1,215 hrs = $14,580
Cost of collection bins:	Supplied by recycler
Total Costs:	**$14,580/yr**

Example 1 (contd)

(b) Baling

Capital cost of baler:	$11,100 (new)
Costs amortized over 5 years: (assume storage space available and interest @ 10% per annum)	$3,330/yr
Costs Amortized over 3 years	$4,810/yr
Operation of baler:	Estimated 1 hr/day of labour = 1 hr/day x 365 days/yr = 365 hrs/yr
Labour costs to operate baler:	Assume labour rate of $12/hr = $12/hr x 365 hrs/yr = $4,400/yr
(assume storage space for 1-2 bales/day (180-250 kg each) available till pick-up by recycler)	
Total Costs: (using a 5 yr amortization period)	= capital cost + labour costs = $3,330/yr + $4,400/yr = $7,730/yr
(using a 3 yr amortization period)	= $4,810/yr + $4,400/yr = $9,210/yr

Potential savings to OGH is greatest when baler is used. This option can save OGH between $[illegible]00 and $2,000 per year.

Sample Financial Calculations for Selected Recycling, Reuse and Reduction Initiatives

Example 2: Biomedical Waste:Placenta Recycling

OGH Data:

# of births:	3,351/yr
Estimated anatomical waste disposed:	7.3 tonnes/yr

Quantity of Placentae:

Estimated # of placentae (i.e. 1 per birth)	= 3,351
Total weight of placentae disposed	= 3,351 x 0.45 kg. = 1,508 kg/yr
% placentae of anatomical waste disposed:	1,508/7,300 kg x 100 = 20%

Current Anatomical Waste Disposal Costs:

Actual disposal cost if used commercial in anerator year round:	$0.452/lb x 7,300 kg x 2.2 lb/kg = $7,260
Pick-up fee:	$52/pick-up x est. 52 pick-ups = $2,704
Cost of boxes & bags:	est. $100
Other costs (cold room, labour, utilities, maintenance, etc., assume not to change significantly if placentae picked up separately)	
Total cost to dispose anatomical wastes:	= $10,064/yr
Total cost to dispose placentae as anatomical wastes (~ 20%)	= $2,013/yr

Cost of Placenta Recycling

Cost of small refrigeration unit to deep freeze placentae:	$0 (supplied by recycler)
Cost of special paraffin boxes:	$0 (supplied by recycler)
Cost of pick-up:	$0 (supplied by recycler)
Cost of storage space, utilities:	Assume easily available for small units

Example 2 (Contd.)

Cost of participation to hospital:	$0
Revenue generated by contracting for service:	$0.35/placenta x 3,351 placentae/yr = $1,173

∴ Total savings to OGH by initiating placenta recycling program:

Reduced disposal costs:	$2,013
Revenue from contracting service:	$1,173
Total Benefit:	**$3,186**

Sample Financial Calculations for Selected Recycling, Reuse and Reduction Initiatives

Example 3: Use of Reusable Diapers

OGH Data:

# of births/yr:	3,351
Annual weight of general waste:	1,216 tonnes/yr
Cost of general waste disposal:	$72,800/yr
Usage of small and premature diapers:	198,000 units

Disposable Diapers:

Diaper Purchasing Costs

	Total Purchased	Estimated Cost per diaper	Total Cost
Small	108,000	15.7¢	$16,992
Premature	90,000	8.6¢	7,755

Total Purchasing Costs: $24,747/yr

Diaper Disposal Costs:

# of diapers:	198,000
Estimated weight of soiled diaper:	0.2 kg
Total weight (estimated)	0.2 x 198,000 = 39,600 kg/yr (3.3% of total general waste)

Secondary Packaging (cardboard):

Small diapers: 3,600 boxes x 0.2 kg box = 720 kg

450 cases (8 boxes/case) x ≈ 1 kg/case = 450 kg

Total of cardboard = 1,170 kg (OCC)

Example 3 (Contd.)

Premature diapers	1,500 boxes x 0.1 kg/box = 150 kg 250 cases (6 boxes/case) x 1 kg/case = 450 kg
Total of cardboard	= 400 kg
Total Secondary Packaging	1,170 kg + 400 kg = 1,570 kg annually of cardboard = (0.13% of total general waste)
Total % weight of general waste disposed (i.e. diapers + packaging)	= 3.4%
Estimated disposal costs: (diapers plus packaging)	3.4% of $72,800 = $2,475/yr
Total Disposal Costs:	$2,475/yr
Total Purchasing and Disposal Costs:	$27,222/yr

Reusable Diapers

Estimated 70 uses per diaper

Diaper Purchasing Costs

	Total Purchased	Estimated Cost per Diaper ($)	Total Cost Ranges ($)	Total Purchase Costs amortized over 2 years (for lowest cost)
Small	5,000	1.09 - 4.50	5,450 - 22,500	$2,725
Premature	1,000	0.84 - 4.50	840 - 4,500	$420

Total Purchasing Costs: $3,145/yr

Example 3 (Contd.)

Diaper Cleaning Costs: Using Services of Central Laundry

	Central Laundry Costs for Water, Utilities, Detergents, Handling, Pick-up Services, Collection Bags per diaper	Total Annual Costs
Small diapers (est. wt = 42 g empty, 84 g with urine)	$0.08	(@ 108,000 uses) $8,640
Newborn diapers/premature (est. wt = 34 g empty, 68 g with urine)	$0.07	(@ 90,000 uses) $6,300
Total Usage Costs/year		$14,940

Total purchasing and usage costs: = $3,145 + $14,940
= $18,085

∴ For OGH, it is more economical to use reusable diapers which will save hospital $9,000 annually.

Sample Financial Calculations for Selected Recycling, Reuse and Reduction Initiatives

Example 4: **Reducing the quantities of medical dressing trays waste by replacing with units sterilized on site.**

OGH Data:

# of beds:	529
#of dressing trays for AKU (usage per year):	20,676

Cost of Reusable System:

Materials (disposable)	
Autoclave Tape	$0.01/unit
Radiopaque Clamp	$0.1/unit
Gauzes	$0.36/unit
Total Materials (disposable)	$0.47/unit
Materials (reusable + sterilizing cost)	
Linen wraps	$0.72/unit
Instruments	$0.06/unit
Total Materials (reusable)	$0.78/unit
Total Cost of Reusable (sterilizing) & Disposable Materials per unit	$0.47 + 0.78 = $1.25

Labour

Tray prep.,4 mins.@ $16.53/hr	$1.10
Tray cleaning 4 mins @ $15.19/hr	$1.01
Total Labour per unit	$2.11
Total Materials and Labour Costs per Unit	$3.36 per tray
Total Annually	$69,471

Example 4 (Contd.)

Cost of Disposable System:

Materials (estimated disposable)	$3.36 per unit
Total Cost of Materials Annually (with 20,676 usages)	$69,471

Disposal Costs:

	Unit Wt	Annual Wt
Weight of Tray Assembly	0.15 kg	3,010 kg
Weight of Secondary Packaging (cardboard) which holds 20 units (i.e. 1,034 units)	0.75 kg	775 kg
Total Weight of Disposable Items		3,876 kg
	(or 0.32% of Total General Waste)	
Estimated Disposal Costs	0.32% of $72,800 $233	
Total Purchasing and Disposal Costs	$69,704	

∴ **For OGH it is more economical to sterilize on-site and have a reusable system for their dressing trays. This will save the hospital $233 per year.**

9.2 General Recommendations for Waste Reduction, Reuse and Recycle at OGH

From the audit at OGH, 77% of the waste disposed is Food, Paper and Plastic. The top 5 individual specific wastes are:

Food and Food Liquid	22%	250 tonnes/year
OCC and Kraft	14%	175 tonnes/year
Wet Paper and Gauzes	8%	100 tonnes/year
Medical Plastic	8%	100 tonnes/year
Fine Paper and CPO	7.5%	94 tonnes/year

The recommendation to OGH is to initially concentrate on examining opportunities for these 5 individual streams because of their size.

Because food waste is the largest single waste stream and contains assignment portion of packaging residuals, some consideration could be given to a composter system for this stream. If a composter was used, some other components of the non-recyclable paper waste stream, e.g. diapers, incontinence pads, could also be diverted to the composter.

Also, OGH should consider cardboard recycling (OCC) in combination with kraft paper (only). Although Ottawa Carleton Region has a disposal bin in place for 20% by volume of OCC, the 14% value by weight found at OGH could easily be mistaken for more than 20% by volume. To avoid potential fines and levies, the OCC should be collected for recycling. OGH already recycles some of its fine paper and computer printout, but an expanded effort needs to be developed. Medical plastics do not have readily available markets at this time and should be evaluated on a case by case basis for individual items. Further studies need to be conducted.

Other 3Rs opportunities that should also be explored include:

Newspaper	1.5%	19 tonnes/year
Food Glass	2.5%	28 tonnes/year
Food Metal	1.5%	19 tonnes/year

These are recommended because they are "blue box" wastes currently collected in Ottawa and these are wastes targetted by the provincial Ministry of the Environment for potential mandatory segregation and recycling. It should be feasible to extend the blue box to institutions like OGH.

For other hospitals, the chosen streams may be different because of different circumstances.

9.3 Choosing Waste Reduction, Reuse and Recycling Options for Your Facility

Initially, for all of the chosen streams, the feasibility of waste reduction as outlined in Table 19 should be explored. Since this will almost inevitably lead to some changes which will involve people doing things differently, these people should be involved in the decisions and in designing implementation schemes that make sense. This is imperative for successful implementation. **DO NOT DO THIS IN ISOLATION - GET PEOPLE INVOLVED - THEY WILL BE YOUR BEST SOURCE OF GOOD IDEAS.**

Make sure that the various committees in the hospital, such as product evaluation and standardization committees, are involved. They will obviously have to be satisfied that any changes from, for example, disposable items to reusable meet all the standards for effectiveness and patient and health care worker safety. The Environment Committee should also be involved in every decision involving a change in practice. They are masterminding the direction of the hospital toward a "greener institution". Suggested changes should be consistent with their overall plans.

A similar caveat is also appropriate for recycling. Almost all recycling opportunities require some in-hospital changes for separate collection of recyclables. Talk to staff; get input of ideas that will make segregation easier. **Do not forget the housekeeping people.** The will have to

do the separate collection and they know better than anyone what is the most **practical** approach.

Keep a sense of perspective. Do not try to capture every last molecule of recyclable material. For example, if you can identify 70-90% of a particular material coming from 3 areas, start with separate collections in those three areas. You can always extend it later (after the inevitable bugs have been worked out of the system!).

Do not start to do any separate collections for recycling or reuse until you have a market for the waste. Make sure the market **and** the infrastructure to get materials to that market are in place. Then start to separate. If there is no transportation infrastructure in place, ask your suppliers if they can help. It is, after all, their materials and packaging that become your waste management problem.

Appendix 4 contains a list of contacts who should be able to help you establish what markets exist for what commodities within your geographic area. Most of the organizations listed are publicly funded, with a mandate to help industry, commerce and institutions better manage their wastes, so do not hesitate to ask for help.

Once again, any plans for change in procedures in collecting wastes within the hospital should be referred to the Product Evaluation and Standardization Committees and Environment Committees, and should have the blessing of Infection Control and Housekeeping.

10. IMPLEMENTATION

Having established what reduction, reuse or recycling opportunities make sense, and having assessed, in detail, the financial implications of those that appear the most promising, the next step is to develop an initial implementation plan.

The suggestion that this be an "initial plan" is made because things are moving very rapidly in hospital waste management at the present time. Disposal fees are escalating very quickly and more and more municipalities are instituting bans on specific materials going to landfill. Do not discard any notes on possible 3Rs opportunities judged not to be economic at this time. That may change next year or in 2 or 3 years' time.

10.1 Involve Staff at the Hospital

Again, as in the initial assessment of 3Rs opportunities, get the people involved who will be affected by any changes. Ask for **and use** good suggestions on the easiest ways to make things work most practically. Make sure people know why you want to do things differently; what this will achieve in terms of avoiding waste going for disposal and benefits to the environment. People are interested.

The reason for this continued stress on involving people is two-fold. First, they truly will provide the most practical suggestions for implementation and, second, if they have had meaningful input, they have a stake in making things work.

10.2 Develop a Reporting Format: The Implementation Plan

When you have decided what things you want to implement and how this needs to be done, put together a report seeking the approval of senior management. It is not possible to detail how this should be done as different hospitals have different protocols for approving changes.

Perhaps, in some hospitals, the Environment Committee has full approval authority for spending up to a certain ceiling. In others, this Committee may only have a technical review mandate. If product or procedural changes are required, it may require the approval of the Purchasing and Standardization Committee.

Any Implementation Plan may include some or all of the following:

1. A detailed description of the change(s)
2. A description of the benefits of making these changes
3. A recommendation for capital investment
4. A recommendation for manpower and other non capital expenditures
5. An analysis of cost/benefit
6. A review of potential funding programs to offset costs
7. An implementation schedule and strategy

For different hospitals, the Plan may require approval by different people for different elements of the Plan. If a procedure change is involved, this may require approval by a Purchasing and Standardization Committee. Capital allocation may require another approval mechanism, and Manpower and Operating costs another mechanism. Once all approvals are in place, it is time to implement.

In drawing up the implementation schedule and strategy, "slower and surer" is more likely to be successful in the long run. Do not try to have everything in place on day one. If it makes sense, phase in implementation. For example, if a decision is made to collect and bale corrugated cardboard, and it is known from the audit that 80% of the cardboard comes from 1 or 2 areas: start here. When the system works well in the two areas, then go after all or some of the other 20% that might come from a lot of different areas. This can all be written up as part of the strategy, but the more gradual implementation gives an opportunity to make minor adjustments to the suggested method of operation without confusing too many people.

Even after all of the initial opportunities have been implemented, a continuous review to improve the workability of these systems should be undertaken. As economics or regulatory climates change, the feasibility of implementing other 3Rs opportunities should be reviewed. You should work to make sure that the feasibility of implementing these additional opportunities has not been impaired by earlier changes.

10.3 Program Promotion

The success of any waste minimization program relies very heavily on the participants' support and cooperation. It is, therefore, very important to promote the program to staff and provide information on how and why they should participate. External promotion to the surrounding community may also be beneficial in recruiting more volunteers, if required. Contact your local municipality or provincial recycling organization for educational and promotional information.

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Glossary of Terms

Activity Descriptors: The type of activity which can best be related to waste generation (e.g. # of beds occupied, # of surgeries, # of staff per section).

Activity Levels: The level of waste generating activity.

AW: Annual waste quantity in kg/yr of specific waste materials, calculated from waste factors (WF) and your activity levels (i.e. activity level/ yr x waste factor (kg) = annual waste (kg/yr).

BoroS/Glass: Borosilicate glass, i.e. most laboratory glassware, currently non recyclable.

CPO/Paper: Computer printout.

Decontam: Decontamination area used for cleaning food containers and supplies, and operating materials and supplies.

Food: All food wastes and other organic materials such as flowers (does not include yard waste).

Food/Cont./Plastics: Disposable food containers (e.g. juice) or other non medical containers (e.g. soaps, cleansers, etc.)

Food/Metal: Disposable aluminum or steel food and beverage containers.

Gen: Med: General Medicine.

Gloves/Plastic: Includes both latex and polyvinylchloride gloves.

Hairnets/Paper: Represents the disposable hair, food and mouth, etc., coverings (generally rayon or polyester).

ICU: Intensive Care Unit.

Incont/Paper: Adult incontinence.

Kraft/Paper: Brown wrapping paper.

Medical/Metal: Disposable metal medical implements, e.g. clamps, scalpels (without blades).

Medical/Plastics:	Includes all plastics used in medical procedures or patient treatment (e.g. tubing, intravenous bags, medical solution containers, etc.) Only a small number of commercial recyclers are currently recycling some of this material.
Med. Ster./Paper:	Medical sterile packaging, generally multimaterial, e.g. tissue and film plastic packaging.
MIS:	Management Information Systems.
Misc.:	Miscellaneous materials such as equipment, wood waste, textiles and personal items such as running shoes, etc.
Non Recy/Paper:	Other currently non-recyclable paper materials, e.g. milk cartons, waxed papers, other treated papers.
Non Recyclable:	Waste materials that currently are not in wide demand by commercial processors, e.g. medical plastic materials potentially contaminated with body excretions.
Occ (OCC):	Old corrugated cardboard.
Packaging/Plastic:	Primarily film packaging, (e.g. polyethylene).
Recyclable:	Waste materials that are currently in wide demand by commercial processors (for this study, recyclable implies potentially recyclable and depends on local availability of markets).
SPD:	Supply Purchasing and Distribution.
WF:	Waste Factors, determined from a detailed waste audit conducted at Ottawa General Hospital.
Wet. Pap/Gz./Paper:	Wet paper (e.g. tissue from washrooms, etc.) and gauzes (used in patient treatment, etc.).

APPENDICES

APPENDIX 1: OGH ANNUAL WASTE GENERATION (GENERAL/BIOMEDICAL)

APPENDIX 2: ANNUAL GENERAL WASTE GENERATION PER ACTIVITY DESCRIPTOR

APPENDIX 3: SELECTED LIQUID & CHEMICAL WASTES GENERATED PER SECTION AT OGH PER YEAR

APPENDIX 4: SUGGESTED WASTE SORTING PROCEDURE

APPENDIX 5: HELP SECTION

APPENDIX 1: **OGH Annual General Waste Generation (kg/yr)**
OGH Annual Biomedical Waste Generation (kg/yr)

Appendix 1. OGH Annual General Waste Generation (kg/yr)

Sections	Paper						
	Potentially Recyclable						
	Boxboard	CPO	Fine	Kraft	Newspaper	OCC	Total
Patient Care							
Cancer Lodge	387.0	0.0	149.0	23.9	361.8	0.0	921.7
Gen. Med. (Gerontology/Rheum.)	431.4	127.6	471.7	0.0	253.7	841.9	2126.3
Gen. Med. (Hem./Oncology)	427.9	204.3	329.3	34.9	564.7	1245.5	2806.7
Gen. Med. (Nephrology)	273.0	249.3	462.8	31.8	409.4	1301.0	2727.2
Gen. Med. (Pulmonary, Cardio)	470.9	61.1	215.4	0.0	749.5	1009.6	2506.5
Gynecology	104.8	9.3	160.1	0.0	72.1	4.9	351.2
Intensive Care Unit (ICU)	826.8	698.7	213.6	0.0	60.1	593.7	2392.9
Neurology (Neuro ICU)	85.4	0.0	8.3	0.0	0.0	125.8	219.5
Neurology (Neurosurgery)	306.1	84.2	69.1	8.6	82.3	411.0	961.2
Neurology (Offices,Clinics)	13.2	0.0	585.3	0.0	0.0	424.2	1022.6
Neurology (Vascular Neurology)	479.4	105.0	145.5	31.5	376.8	775.5	1913.7
Nursery	666.5	35.4	132.4	8.8	0.0	9454.5	10297.6
Obstetrics	403.7	0.0	182.9	0.0	1353.6	299.9	2240.0
Ophthamology/Urology	561.5	83.2	333.3	64.4	1061.7	61.3	2165.2
Orthopedics	427.9	154.9	274.2	0.0	309.7	99.9	1266.7
Patient Check Out	343.7	0.0	209.6	0.0	0.0	0.0	553.2
Psychiatry (Beds)	67.2	0.0	195.1	0.0	257.1	105.3	624.6
Psychiatry (Offices)	38.8	134.1	1052.2	11.5	0.0	0.0	1236.5
Short Stay Unit	40.4	4.1	95.5	0.0	120.0	0.0	260.1
Surgery (General,Thoracic)	343.5	239.4	1672.5	78.6	1413.2	1418.7	5165.9
Surgery (Plastic/General)	447.8	172.6	224.3	60.2	906.7	1364.1	3175.7
TOTAL	7146.8	2363.2	7182.0	354.1	8352.4	19536.8	44935.3
% of Total Patient Care General Waste	2.1	0.7	2.1	0.1	2.5	5.8	13.4

* Example: Boxboard as % of Total Patient Care General Waste is
7146.8 kg / 335736.3 kg = 2.1%

Appendix 1. OGH Annual General Waste Generation (Contd.)

Sections	Paper						
	Potentially Recyclable						
	Boxboard	CPO	Fine	Kraft	Newspaper	OCC	Total
Patient Services Diagnostic							
Cardiopulmonary	65.8	91.9	1403.6	0.0	81.8	76.9	1720.0
Gastrointestinal Unit	126.9	59.5	48.3	5.7	0.0	0.0	240.4
Neurophysiology	25.4	2918.8	115.3	2.0	0.0	3.9	3065.4
Nuclear Medicine	30.7	16.9	152.1	0.0	54.2	0.0	254.0
Obstetrics/Ultrasound	168.8	0.0	328.4	8.0	0.0	103.2	608.3
Ophthamology	89.2	4.4	345.3	0.0	0.0	269.3	708.1
Radiology	688.8	1384.6	2962.0	209.0	721.6	616.1	6582.1
TOTAL	1195.6	4476.2	5355.0	224.7	857.6	1069.3	13178.4
% of Total Patient Services Diagnostic General Waste	3.6	13.4	16.0	0.7	2.6	3.2	39.5
Patient Services Service							
Biomedical Engineering	20.5	0.0	4.1	0.0	0.0	19.2	43.9
Cancer Clinic	771.4	69.1	1666.8	45.7	101.0	711.8	3366.0
Dialysis	1071.6	0.0	135.8	0.0	100.5	3639.6	4947.5
Emergency	1163.6	477.2	2045.9	82.3	125.0	697.9	4591.9
Fertility Clinic	86.2	7.4	250.9	4.4	0.0	0.0	348.9
Labour and Delivery	538.5	0.0	776.3	0.0	623.0	1245.7	3183.4
Pharmacy	127.0	0.0	1.8	3.9	16.3	3178.1	3327.2
Recovery, Anaesthesia	178.4	18.0	805.6	0.0	49.7	110.3	1162.0
Surgery	1389.5	0.0	90.1	0.0	0.0	1102.5	2582.1
TOTAL	5346.8	571.7	5777.3	136.3	1015.6	10705.2	23552.9
% of Total Patient Services Service Total General Waste	4.3	0.5	4.6	0.1	0.8	8.6	18.9

Appendix 1. OGH Annual General Waste Generation (Contd.)

Sections	Paper						
	Potentially Recyclable						
	Boxboard	CPO	Fine	Kraft	Newspaper	OCC	Total
Patient Services Therapeutic							
Audiology	26.4	0.0	252.6	0.0	0.0	0.0	279.1
Occup. and Physio. Therapy	24.2	37.3	352.8	11.6	5.0	208.3	639.2
Psychology/Psychiatry Offices/Clinics	426.2	82.8	4993.7	42.7	470.8	419.5	6435.7
Respiratory Therapy (Office)	86.9	0.0	92.2	5.6	0.0	404.6	589.4
Social Work	105.6	414.1	2672.6	0.0	0.0	758.1	3950.4
Speech Therapy	48.2	7.1	66.2	0.0	0.0	0.0	121.5
TOTAL	717.6	541.3	8430.2	59.9	475.8	1790.4	12015.3
% of Total Patient Services Therapeutic Total General Waste	3.3	2.5	38.9	0.3	2.2	8.3	55.4
Patient Services Total	7260.0	5589.2	19562.5	421.0	2349.0	13564.9	48746.6
% of Patient Services Total General Waste	4.0	3.1	10.9	0.2	1.3	7.6	27.1
Laboratories							
Biochemistry	320.6	454.4	294.9	0.0	634.8	1890.3	3595
Blood bank	2.3	0.0	50.8	0.0	0.0	87.9	141.1
Hematology	274.6	623.3	268.6	10.2	0.0	1163.6	2340.3
Microbiology/Infection Control	156.0	1644.8	1936.4	0.0	0.0	1350.1	5087.3
Oncology (Cancer Lab)	58.4	62.5	111.8	15.7	77.8	114.8	441.0
Pathology	472.5	0.0	75.3	22.0	0.0	1038.5	1608.3
Morgue	70.8	0.0	8.2	0.0	0.0	238.3	317.3
Research Lab	0.0	0.0	6.3	0.0	0.0	84.2	90.5
Stat Lab	58.3	2074.7	59.0	88.8	97.8	246.1	2624.7
TOTAL	1413.6	4859.7	2811.3	136.6	810.4	6214.0	16245.5
% of Laboratories Total General Waste	3.7	12.8	7.4	0.4	2.1	16.3	42.7

Appendix 1. OGH Annual General Waste Generation (Contd.)

Sections	Paper						
	Potentially Recyclable						
	Boxboard	CPO	Fine	Kraft	Newspaper	OCC	Total
Administration							
Admissions	94.7	7823.3	1020.5	0.0	0.0	873.3	9811.8
Finance, Admin, Other Offices	2.6	262.3	1338.6	0.0	117.2	296.8	2017.5
Health Services	1.3	0.0	121.2	10.7	0.0	0.0	133.3
Human Resources, Other Offices	0.2	16.5	84.0	0.0	7.4	13.0	121.0
Locker Rooms	69.6	41.9	336.9	0.0	0.0	0.0	448.3
MIS	4.0	813.3	291.7	6.2	7.5	3114.7	4237.5
Medical Records	3.0	3.9	3773.2	1.8	143.0	254.9	4179.9
Library	1.0	3.5	65.1	0.0	29.4	15.7	114.7
Physicians Office	0.7	2.3	9.3	0.9	0.0	0.0	13.2
Physicians Office, Waiting Rm	134.8	11.6	2098.2	13.9	371.6	34.3	2664.4
Purchasing	49.4	971.8	578.7	23.6	0.0	0.0	1623.4
Residents Lodging	296.2	0.0	114.0	18.3	276.9	478.1	1183.6
TOTAL	657.5	9950.4	9831.4	75.4	953.0	5080.9	26548.6
% of Administration Total General Waste	1.5	23.2	22.9	0.2	2.2	11.9	61.9

Appendix 1. OGH Annual General Waste Generation (Contd.)

Sections	Paper						
	Potentially Recyclable						
	Boxboard	CPO	Fine	Kraft	Newspaper	OCC	Total
Support Services							
Coffee Shop	0.0	0.0	353.3	214.2	160.4	67.6	795.5
Decontam	1364.1	0.0	0.0	0.0	0.0	2431.7	3795.7
Decontam (OR Waste)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Decontam (Packaging Waste)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dietetics	3537.1	0.0	0.0	533.9	600.7	44526.6	49198.4
Drug Store (Pharmacy)	39.3	0.0	19.1	0.0	12.3	0.0	70.7
Dry Cleaning	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Engineering	1010.9	46.9	61.8	27.9	0.0	906.0	2053.4
Housekeeping	95.4	0.0	0.0	0.0	47.7	123.2	266.4
Inventory Control	939.9	205.8	5602.4	0.0	238.6	22793.8	29780.6
Receiving	5323.3	16.2	110.3	279.6	85.6	3991.1	9806.2
SPD Office	41.4	33.1	849.1	0.0	38.4	0.0	962.0
Store (La Boutique)	373.8	92.2	0.0	0.0	2089.0	0.0	2555.1
Telecommunication	0.0	0.0	896.4	0.0	0.0	2133.4	3029.8
TOTAL	12725.2	394.2	7892.5	1055.6	3272.7	76973.4	102313.7
% of Support Services Total General Waste	3.0	0.1	1.9	0.3	0.8	18.3	24.3
Miscellaneous							
Building Exterior	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Unidentified Building	534.6	2200.7	429.5	0.0	0.0	20022.3	23187.2
External - Rehab. Facility	0.0	0.0	0.0	0.0	0.0	17926.8	17926.8
TOTAL	534.6	2200.7	429.5	0.0	0.0	37949.2	41114.0
% of Miscellaneous Total General Waste	0.6	2.6	0.5	0.0	0.0	45.1	48.8

Appendix 1. OGH Annual General Waste Generation (Contd.)

Sections	Paper						
	Potentially Recyclable						
	Boxboard	CPO	Fine	Kraft	Newspaper	OCC	Total
Total Whole Building	29737.7	25357.5	47709.2	2042.7	15737.4	159319.2	279903.7
% of Building Total General Waste	2.7	2.3	4.3	0.2	1.4	14.5	25.4
Presently Recycled			8340				8340.0
Total Generated (Disposed+Recycled)	29737.7	25357.5	56049.2	2042.7	15737.4	159319.2	288243.7
% of Total Generated (Overall)	2.6	2.2	4.9	0.2	1.4	13.9	25.2

Appendix 1. OGH Annual General Waste Generation (Contd.)

Sections	Paper								Total
	Potentially Non-Recyclable								
	Diapers	Incont-inents	Under-pads	Non Recyclable	Wet Paper and Gauze	Medical Sterile Pack.	Hair nets Boots etc	Total	Paper
Patient Care									
Cancer Lodge	0.0	0.0	0.0	719.0	780.6	0.0	47.4	1547.0	2468.7
Gen. Med. (Gerontology/Rheum.)	0.0	13128.2	2359.3	525.6	3607.4	409.7	8.6	20038.8	22165.1
Gen. Med. (Hem./Oncology)	0.0	1340.5	1782.1	401.4	3666.6	1458.8	99.4	8748.8	11555.5
Gen. Med. (Nephrology)	0.0	1475.8	1247.8	856.9	3611.1	380.3	31.9	7603.9	10331.1
Gen. Med. (Pulmonary, Cardio)	0.0	11284.9	425.0	581.8	3678.1	423.6	33.9	16427.4	18933.9
Gynecology	0.0	4533.0	666.1	248.9	1479.6	208.8	0.0	7136.4	7487.7
Intensive Care Unit (ICU)	0.0	937.8	2077.1	41.5	2777.3	893.7	89.4	6816.7	9209.6
Neurology (Neuro ICU)	0.0	1999.5	378.7	67.8	908.5	80.7	10.1	3445.3	3664.8
Neurology (Neurosurgery)	0.0	4794.8	831.8	315.6	2821.0	243.3	21.8	9028.3	9989.5
Neurology (Offices,Clinics)	0.0	0.0	0.0	2834.2	0.0	0.0	0.0	2834.2	3856.8
Neurology (Vascular Neurology)	1228.8	3666.2	2207.5	359.9	3228.2	502.6	22.5	11215.7	13129.4
Nursery	27880.9	0.0	0.0	48.7	2624.5	1354.4	20.0	31928.6	42226.2
Obstetrics	163.2	570.1	1943.0	326.5	4651.3	352.7	1.6	8008.5	10248.5
Ophthamology/Urology	0.0	0.0	991.4	493.6	2225.5	299.4	4.3	4014.3	6179.5
Orthopedics	0.0	1379.6	2783.8	477.0	3104.8	367.9	94.3	8207.3	9474.0
Patient Check Out	0.0	0.0	2292.4	174.6	2676.9	322.2	0.0	5466.0	6019.2
Psychiatry (Beds)	0.0	3611.0	196.6	712.3	938.0	83.0	20.3	5561.3	6186.0
Psychiatry (Offices)	0.0	0.0	0.0	779.4	509.6	0.0	0.0	1289.0	2525.5
Short Stay Unit	0.0	0.0	66.3	20.8	60.8	21.3	22.7	191.9	452.0
Surgery (General,Thoracic)	0.0	2735.6	585.5	485.3	3252.5	225.4	0.0	7284.4	12450.3
Surgery (Plastic/General)	0.0	1163.9	1150.4	385.7	4360.4	783.7	47.1	7891.2	11067.0
TOTAL	29272.9	52621.0	21984.8	10856.8	50963.0	8411.4	575.3	174685.1	219620.4
% of Total Patient Care General Waste	8.7	15.7	6.5	3.2	15.2	2.5	0.2	52.0	65.4

Appendix 1. OGH Annual General Waste Generation (Contd.)

Sections	Paper								Total Paper
	Potentially Non-Recyclable								
	Diapers	Incont-inents	Under-pads	Non Recyclable	Wet Paper and Gauze	Medical Sterile Pack.	Hair nets Boots etc	Total	
Patient Services Diagnostic									
Cardiopulmonary	0.0	0.0	0.0	105.8	289.6	50.0	0.0	445.4	2165.4
Gastrointestinal Unit	0.0	0.0	42.8	85.4	684.3	358.9	2.6	1173.9	1414.3
Neurophysiology	0.0	18.3	0.0	93.0	201.4	25.1	0.0	337.8	3403.2
Nuclear Medicine	0.0	0.0	0.0	29.4	28.5	33.2	0.0	91.2	345.2
Obstetrics/Ultrasound	0.0	0.0	37.7	617.6	1160.8	226.6	0.0	2042.6	2650.9
Ophthamology	0.0	0.0	0.0	95.7	285.3	35.5	0.0	416.5	1124.6
Radiology	49.2	0.0	468.1	732.3	1327.5	327.1	28.9	2933.1	9515.3
TOTAL	49.2	18.3	548.5	1759.2	3977.4	1056.5	31.5	7440.5	20618.9
% of Total Patient Services Diagnostic General Waste	0.1	0.1	1.6	5.3	11.9	3.2	0.1	22.3	61.7
Patient Services Service									
Biomedical Engineering	0.0	0.0	0.0	36.3	74.3	2.8	0.0	113.4	157.2
Cancer Clinic	0.0	0.0	304.5	2264.8	1263.9	249.8	17.5	4100.5	7466.5
Dialysis	0.0	0.0	333.1	111.1	4416.9	1490.1	654.8	7006.0	11953.5
Emergency	0.0	74.5	2090.3	3776.7	9721.8	1252.8	3.3	16919.4	21511.3
Fertility Clinic	0.0	0.0	0.0	246.0	158.5	67.5	0.0	472.1	821.0
Labour and Delivery	0.0	0.0	1354.4	1811.7	3189.6	941.6	292.7	7590.1	10773.5
Pharmacy	0.0	0.0	0.0	181.4	256.1	434.7	10.8	883.1	4210.3
Recovery, Anaesthesia	0.0	0.0	176.5	94.7	443.8	265.0	205.5	1185.6	2347.6
Surgery	0.0	0.0	497.1	27.2	3393.9	1207.4	0.0	5125.6	7707.7
TOTAL	0.0	74.5	4755.9	8550.0	22918.9	5911.7	1184.6	43395.7	66948.6
% of Total Patient Services Service Total General Waste	0.0	0.1	3.8	6.9	18.4	4.7	1.0	34.8	53.8

Appendix 1. OGH Annual General Waste Generation (Contd.)

Sections	Paper								
	Potentially Non-Recyclable								Total
	Diapers	Incont-inents	Under-pads	Non Recyclable	Wet Paper and Gauze	Medical Sterile Pack.	Hair nets Boots etc	Total	Paper
Patient Services Therapeutic									
Audiology	0.0	0.0	0.0	64.5	204.1	25.5	0.0	294.1	573.1
Occup. and Physio. Therapy	0.0	0.0	0.0	321.0	829.3	2.0	16.3	1168.6	1807.8
Psychology/Psychiatry Offices/Clinics	0.0	0.0	0.0	1950.5	648.2	0.0	0.0	2598.7	9034.4
Respiratory Therapy (Office)	0.0	0.0	0.0	42.8	142.4	0.0	0.0	185.2	774.5
Social Work	0.0	0.0	0.0	372.9	141.3	0.0	0.0	514.1	4464.5
Speech Therapy	0.0	0.0	0.0	24.4	32.2	9.7	0.6	66.9	188.4
TOTAL	0.0	0.0	0.0	2776.0	1997.4	37.3	16.8	4827.5	16842.8
% of Total Patient Services Therapeutic	0.0	0.0	0.0	12.8	9.2	0.2	0.1	22.3	77.7
Total General Waste									
Patient Services Total	49.2	92.8	5304.4	13085.2	28893.7	7005.5	1233.0	55663.8	104410.3
% of Patient Services Total General Waste	0.0	0.1	3.0	7.3	16.1	3.9	0.7	31.0	58.1
Laboratories									
Biochemistry	0.0	0.0	8.1	32.0	542.6	3.6	11.3	597.6	4192.6
Blood bank	0.0	0.0	15.9	0.8	44.8	7.1	22.0	90.5	231.6
Hematology	0.0	0.0	305.3	1937.1	1325.8	99.3	0.0	3667.5	6007.8
Microbiology/Infection Control	0.0	0.0	0.0	528.1	184.8	102.4	0.0	815.3	5902.7
Oncology (Cancer Lab)	0.0	0.0	0.0	328.7	103.5	0.0	0.0	432.2	873.2
Pathology	0.0	0.0	0.0	21.7	1452.3	0.0	0.0	1474.0	3082.3
Morgue	0.0	0.0	0.0	9.7	177.8	66.8	0.0	254.3	571.5
Research Lab	0.0	0.0	27.8	309.4	219.2	0.0	0.0	556.4	646.9
Stat Lab	0.0	0.0	57.9	755.0	326.1	0.0	0.0	1139.0	3763.7
TOTAL	0.0	0.0	415.0	3922.4	4377.0	279.1	33.2	9026.6	25772.3
% of Laboratories Total General Waste	0.0	0.0	1.1	10.3	11.5	0.7	0.1	23.7	66.4

Appendix 1. OGH Annual General Waste Generation (Contd.)

Sections	Paper								Total
	Potentially Non-Recyclable								
	Diapers	Incont-inents	Under-pads	Non Recyclable	Wet Paper and Gauze	Medical Sterile Pack.	Hair nets Boots etc	Total	Paper
Administration									
Admissions	0.0	0.0	0.0	1254.6	191.3	0.0	0.0	1445.9	11257.7
Finance, Admin, Other Offices	0.0	0.0	0.0	125.4	2919.6	0.0	6.7	3051.6	5069.1
Health Services	0.0	0.0	0.0	15.0	42.3	11.2	0.0	68.6	201.9
Human Resources, Other Offices	0.0	0.0	0.0	7.9	183.2	0.0	0.4	191.5	312.6
Locker Rooms	0.0	0.0	0.0	159.1	327.4	1.6	5.4	493.5	941.8
MIS	0.0	0.0	0.0	194.0	63.5	0.0	0.0	257.5	4494.9
Medical Records	0.0	0.0	0.0	130.4	45.8	0.0	0.0	176.2	4356.1
Library	0.0	0.0	0.0	41.2	23.1	0.0	0.0	64.3	179.0
Physicians Office	0.0	0.0	0.0	4.6	7.2	0.0	0.0	11.8	24.9
Physicians Office, Waiting Rm	0.0	0.0	0.0	1640.3	1056.5	1.1	10.9	2708.8	5373.2
Purchasing	0.0	0.0	0.0	537.3	62.0	0.0	0.0	599.3	2222.8
Residents Lodging	0.0	0.0	0.0	550.3	597.4	0.0	36.3	1184.0	2367.6
TOTAL	0.0	0.0	0.0	4660.2	5519.2	14.0	59.6	10253.1	36801.7
% of Administration Total General Waste	0.0	0.0	0.0	10.9	12.9	0.0	0.1	23.9	85.8

Appendix 1. OGH Annual General Waste Generation (Contd.)

Sections	Paper								Total
	Potentially Non-Recyclable								
	Diapers	Incont-inents	Under-pads	Non Recyclable	Wet Paper and Gauze	Medical Sterile Pack.	Hair nets Boots etc	Total	Paper
Support Services									
Coffee Shop	0.0	0.0	0.0	1159.2	2086.3	0.0	0.0	3245.6	4041.0
Decontam	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3795.7
Decontam (OR Waste)	0.0	0.0	0.0	0.0	2515.2	2515.2	0.0	5030.3	5030.3
Decontam (Packaging Waste)	0.0	0.0	0.0	565.9	5093.2	0.0	0.0	5659.1	5659.1
Dietetics	0.0	0.0	0.0	3191.3	6404.1	0.0	3.2	9598.5	58796.9
Drug Store (Pharmacy)	0.0	0.0	0.0	137.8	0.0	0.0	0.0	137.8	208.5
Dry Cleaning	0.0	0.0	0.0	10.3	0.0	0.0	0.0	10.3	10.3
Engineering	0.0	0.0	0.0	119.0	684.5	0.0	17.4	820.9	2874.3
Housekeeping	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	266.4
Inventory Control	0.0	0.0	134.8	459.0	1401.3	178.2	44.9	2218.2	31998.8
Receiving.	0.0	0.0	0.0	217.9	136.5	7.9	0.0	362.3	10168.4
SPD Office	0.0	0.0	21.7	73.8	22	28.7	7.2	356.9	1318.9
Store (La Boutique)	0.0	0.0	0.0	0.0	29.1	0.0	0.0	29.1	2584.2
Telecommunication	0.0	0.0	0.0	1183.0	201.7	0.0	0.0	1384.7	4414.5
TOTAL	0.0	0.0	156.5	7117.2	18777.3	2729.9	72.8	28853.7	131167.4
% of Support Services Total General Waste	0.0	0.0	0.0	1.7	4.5	0.6	0.0	6.8	31.1
Miscellaneous									
Building Exterior	0.0	0.0	0.0	360.3	0.0	0.0	0.0	360.3	360.3
Unidentified Building	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23187.2
External - Rehab. Facility	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17926.8
TOTAL	0.0	0.0	0.0	360.3	0.0	0.0	0.0	360.3	41474.3
% of Miscellaneous Total General Waste	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.4	49.3

Appendix 1. OGH Annual General Waste Generation (Contd.)

Sections	Paper								Total Paper
	Potentially Non-Recyclable								
	Diapers	Incont-inents	Under-pads	Non Recyclable	Wet Paper and Gauze	Medical Sterile Pack.	Hair nets Boots etc	Total	
Total Whole Building	29322.2	52713.8	27860.7	40002.2	108530.2	18439.8	1974.0	278842.8	558746.5
% of Building Total General Waste	2.7	4.8	2.5	3.6	9.8	1.7	0.2	25.3	50.7
Presently Recycled								0.0	8340.0
Total Generated (Disposed+Recycled)	29322.2	52713.8	27860.7	40002.2	108530.2	18439.8	1974.0	278842.8	567086.5
% of Total Generated (Overall)	2.6	4.6	2.4	3.5	9.5	1.6	0.2	24.4	49.6

Appendix 1. OGH Annual General Waste Generation (Contd.)

	Plastic							
	Non-Recyclable			Recyclable				
Sections	Medical	Gloves	Total	Packaging	Food and Container	Polystyrene	Total	Total
Patient Care								
Cancer Lodge	0.0	0.0	0.0	293.0	253.9	102.3	649.2	649.2
Gen. Med. (Gerontology/Rheum.)	975.5	626.5	1602.0	981.9	140.3	199.3	1321.4	2923.4
Gen. Med. (Hem./Oncology)	3507.6	750.4	4258.0	1101.3	214.7	162.1	1478.1	5736.1
Gen. Med. (Nephrology)	3833.4	432.1	4265.5	803.5	218.7	264.1	1286.3	5551.8
Gen. Med. (Pulmonary, Cardio)	2388.7	709.8	3098.5	982.2	192.7	197.9	1372.9	4471.3
Gynecology	805.5	314.4	1120.0	471.8	226.1	64.5	762.4	1882.4
Intensive Care Unit (ICU)	5236.2	1221.0	6457.2	416.9	64.7	74.8	556.4	7013.6
Neurology (Neuro ICU)	428.6	225.2	653.8	262.4	15.7	34.7	312.7	966.5
Neurology (Neurosurgery)	1340.6	683.3	2023.9	797.0	102.7	133.7	1033.4	3057.3
Neurology (Offices,Clinics)	0.0	0.0	0.0	21.7	0.0	0.0	21.7	21.7
Neurology (Vascular Neurology)	2324.9	810.4	3135.3	630.7	103.4	99.4	833.5	3968.8
Nursery	4206.9	570.2	4777.2	1015.8	2.1	17.0	1035.0	5812.2
Obstetrics	1544.3	210.0	1754.3	1012.1	576.7	180.2	1769.1	3523.4
Ophthamology/Urology	2176.3	390.2	2566.5	572.9	215.0	139.0	926.9	3493.3
Orthopedics	2246.9	628.6	2875.5	614.2	182.2	100.0	896.5	3772.0
Patient Check Out	3320.1	294.5	3614.6	286.8	211.4	79.4	577.6	4192.2
Psychiatry (Beds)	161.1	264.4	425.5	561.0	65.5	334.8	961.3	1386.8
Psychiatry (Offices)	0.0	5.9	5.9	54.6	86.1	56.0	196.7	202.6
Short Stay Unit	70.3	11.2	81.5	39.7	28.3	7.7	75.8	157.2
Surgery (General,Thoracic)	3023.0	521.8	3544.7	354.8	156.9	170.0	681.7	4226.4
Surgery (Plastic/General)	3193.1	607.5	3800.6	649.7	155.5	165.8	971.0	4771.6
TOTAL	40783.1	9277.3	50060.4	11924.1	3212.6	2582.8	17719.5	67779.9
% of Total Patient Care General Waste	12.1	2.8	14.9	3.6	1.0	0.8	5.3	20.2

Appendix 1. OGH Annual General Waste Generation (Contd.)

Sections	Plastic							
	Non-Recyclable			Recyclable				
	Medical	Gloves	Total	Packaging	Food and Container	Polystyrene	Total	Total
Patient Services Diagnostic								
Cardiopulmonary	436.3	8.1	444.5	171.2	25.8	32.6	229.7	674.2
Gastrointestinal Unit	1784.3	234.3	2018.6	174.6	2.8	9.2	186.7	2205.3
Neurophysiology	48.2	13.2	61.4	123.3	15.2	20.3	158.8	220.1
Nuclear Medicine	34.7	62.1	96.9	20.4	3.2	4.2	27.7	124.6
Obstetrics/Ultrasound	299.1	306.4	605.5	375.7	0.0	18.0	393.8	999.3
Ophthamology	65.8	95.0	160.8	64.9	5.3	10.5	80.7	241.5
Radiology	2353.9	372.1	2726.0	1088.8	102.8	191.3	1382.8	4108.9
TOTAL	5022.4	1091.2	6113.6	2019.0	155.0	286.2	2460.2	8573.8
% of Total Patient Services Diagnostic General Waste	15.0	3.3	18.3	6.0	0.5	0.9	7.4	25.7
Patient Services Service								
Biomedical Engineering	0.0	0.0	0.0	17.4	3.8	0.0	21.1	21.1
Cancer Clinic	682.5	284.2	966.7	700.0	77.4	267.2	1044.6	2011.3
Dialysis	10436.7	968.9	11405.6	351.9	123.6	199.4	675.0	12080.5
Emergency	6110.6	1904.7	8015.2	1282.0	212.4	252.4	1746.7	9762.0
Fertility Clinic	1.8	30.8	32.6	93.0	57.8	27.4	178.2	210.8
Labour and Delivery	2272.7	855.0	3127.7	531.3	184.3	83.0	798.5	3926.2
Pharmacy	2962.5	134.7	3097.2	140.1	0.0	91.0	231.0	3328.2
Recovery, Anaesthesia	2214.1	246.3	2460.4	597.3	2.4	16.7	616.3	3076.7
Surgery	5664.0	780.9	6444.9	0.0	0.0	1.8	1.8	6446.6
TOTAL	30344.8	5205.5	35550.3	3712.8	661.6	938.9	5313.3	40863.6
% of Total Patient Services Service Total General Waste	24.4	4.2	28.5	3.0	0.5	0.8	4.3	32.8

Appendix 1. OGH Annual General Waste Generation (Contd.)

Sections	Plastic							
	Non-Recyclable			Recyclable				
	Medical	Gloves	Total	Packaging	Food and Container	Polystyrene	Total	Total
Patient Services Therapeutic								
Audiology	33.7	25.8	59.5	34.1	1.3	4.9	40.3	99.8
Occup. and Physio. Therapy	16.2	17.7	33.9	88.4	114.9	72.6	275.9	309.8
Psychology/Psychiatry Offices/Clinics	72.2	150.1	222.3	295.1	130.4	74.4	499.9	722.2
Respiratory Therapy (Office)	31.2	0.0	31.2	52.7	11.9	17.8	82.4	113.6
Social Work	0.0	0.0	0.0	0.0	220.4	130.8	351.2	351.2
Speech Therapy	1.4	2.3	3.7	7.9	1.8	2.3	11.9	15.7
TOTAL	154.7	196.0	350.6	478.2	480.7	302.7	1261.6	1612.2
% of Total Patient Services Therapeutic Total General Waste	0.7	0.9	1.6	2.2	2.2	1.4	5.8	7.4
Patient Services Total	35521.8	6492.6	42014.5	6210.0	1297.3	1527.8	9035.1	51049.6
% of Patient Services Total General Waste	19.8	3.6	23.4	3.5	0.7	0.9	5.0	28.4
Laboratories								
Biochemistry	2477.5	13.9	2491.4	603.6	22.1	53.5	679.2	3170.6
Blood bank	322.9	2.9	325.8	12.1	0.4	4.2	16.7	342.5
Hematology	288.5	594.9	883.5	547.3	2.7	6.7	556.6	1440.1
Microbiology/Infection Control	1475.8	143.3	1619.1	311.2	30.4	2.6	344.3	1963.4
Oncology (Cancer Lab)	557.3	7.5	564.8	48.3	38.6	15.5	102.4	667.2
Pathology	170.4	0.0	170.4	272.8	13.5	21.7	307.9	478.4
Morgue	179.1	127.9	307.1	283.5	0.0	1.3	284.8	591.8
Research Lab	34.4	57.1	91.6	63.7	4.9	5.9	74.5	166.0
Stat Lab	0.0	136.3	136.3	219.2	1.2	8.6	229.0	365.2
TOTAL	5506.1	1083.8	6589.9	2361.6	113.7	119.9	2595.3	9185.2
% of Laboratories Total General Waste	14.5	2.8	17.3	6.2	0.3	0.3	6.8	24.1

Appendix 1. OGH Annual General Waste Generation (Contd.)

Sections	Plastic							
	Non-Recyclable			Recyclable				
	Medical	Gloves	Total	Packaging	Food and Container	Polystyrene	Total	Total
Administration								
Admissions	156.6	0.0	156.6	0.0	0.0	86.5	86.5	243.0
Finance, Admin, Other Offices	0.0	0.0	0.0	0.0	88.1	26.3	114.4	114.4
Health Services	0.0	0.0	0.0	45.1	0.5	0.8	46.4	46.4
Human Resources, Other Offices	0.0	0.0	0.0	0.0	5.5	1.6	7.2	7.2
Locker Rooms	0.6	12.0	12.6	99.5	52.0	73.3	224.8	237.4
MIS	0.0	0.0	0.0	18.1	19.6	140.4	178.0	178.0
Medical Records	0.0	3.6	3.6	20.6	4.1	1.2	25.9	29.5
Library	0.0	0.0	0.0	7.3	3.6	5.2	16.1	16.1
Physicians Office	0.6	0.0	0.6	4.3	0.1	3.3	7.7	8.3
Physicians Office, Waiting Rm	0.0	11.8	11.8	180.3	70.4	82.9	333.7	345.5
Purchasing	0.0	0.0	0.0	71.4	29.9	23.8	125.1	125.1
Residents Lodging	0.0	0.0	0.0	224.2	194.3	78.3	496.9	496.9
TOTAL	157.8	27.5	185.3	670.8	468.2	523.5	1662.6	1847.8
% of Administration Total General Waste	0.4	0.1	0.4	1.6	1.1	1.2	3.9	4.3

Appendix 1. OGH Annual General Waste Generation (Contd.)

Sections	Plastic							
	Non-Recyclable			Recyclable				
	Medical	Gloves	Total	Packaging	Food and Container	Polystyrene	Total	Total
Support Services								
Coffee Shop	0.0	0.0	0.0	533.0	1104.6	729.5	2367.0	2367.0
Decontam	277.2	0.0	277.2	934.4	10186.3	35.6	11156.3	11433.5
Decontam (OR Waste)	2515.2	0.0	2515.2	0.0	0.0	0.0	0.0	2515.2
Decontam (Packaging Waste)	0.0	0.0	0.0	0.0	1131.8	2263.6	3395.4	3395.4
Dietetics	439.2	142.4	581.6	2789.5	4968.0	1954.0	9711.5	10293.1
Drug Store (Pharmacy)	22.3	0.0	22.3	3.4	2.8	2.0	8.2	30.5
Dry Cleaning	0.0	0.0	0.0	13.5	0.7	0.2	14.4	14.4
Engineering	0.7	65.1	65.7	39.9	72.8	25.5	138.3	204.1
Housekeeping	0.0	0.0	0.0	0.0	95.4	0.0	95.4	95.4
Inventory Control	511.7	14.7	526.4	1392.6	79.7	128.1	1600.4	2126.8
Receiving	0.0	0.0	0.0	720.5	1.5	368.7	1090.7	1090.7
SPD Office	82.3	2.4	84.7	224.1	12.8	20.3	257.1	341.8
Store (La Boutique)	0.0	0.0	0.0	123.3	0.0	0.0	123.3	123.3
Telecommunication	0.0	0.0	0.0	43.8	175.2	0.0	219.0	219.0
TOTAL	3848.5	224.5	4073.1	6817.9	17831.7	5527.6	30177.2	34250.3
% of Support Services Total General Waste	0.9	0.1	1.0	1.6	4.2	1.3	7.2	8.1
Miscellaneous								
Building Exterior	0.0	0.0	0.0	0.0	116.3	154.4	270.7	270.7
Unidentified Building	1010.4	0.0	1010.4	187.9	0.0	280.4	468.3	1478.7
External - Rehab. Facility	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	1010.4	0.0	1010.4	187.9	116.3	434.9	739.0	1749.4
% of Miscellaneous Total General Waste	1.2	0.0	1.2	0.2	0.1	0.5	0.9	2.1

Appendix 1. OGH Annual General Waste Generation (Contd.)

Sections	Plastic							
	Non-Recyclable			Recyclable				
	Medical	Gloves	Total	Packaging	Food and Container	Polystyrene	Total	Total
Total Whole Building	86827.7	17105.7	103933.4	28172.3	23039.9	10716.5	61928.7	165862.1
% of Building Total General Waste	7.9	1.6	9.4	2.6	2.1	1.0	5.6	15.1
Presently Recycled							39.0	39.0
Total Generated (Disposed + Recycled)	86827.7	17105.7	103933.4	28172.3	23039.9	10716.5	61967.7	165901.1
% of Total Generated (Overall)	7.6	1.5	9.1	2.5	2.0	0.9	5.4	14.5

Appendix 1. OGH Annual General Waste Generation (Contd.)

Sections	Glass							Metal		
	Recyclable			Non-Recyclable			Total Glass			
	Clear Container	Amber Container	Total	Clear BoroS.	Amber BoroS.	Total		Medical	Food	Total
Patient Care										
Cancer Lodge	0.0	0.0	0.0	17.0	0.0	17.0	17.0	0.0	131.0	131.0
Gen. Med. (Gerontology/Rheum.)	0.0	0.0	0.0	8.4	56.9	65.3	65.3	13.3	168.3	181.6
Gen. Med. (Hem./Oncology)	418.7	0.0	418.7	60.7	31.0	91.7	510.4	64.1	258.6	322.7
Gen. Med. (Nephrology)	151.4	0.0	151.4	17.0	0.0	17.0	168.4	42.8	271.1	313.9
Gen. Med. (Pulmonary, Cardio)	175.0	0.0	175.0	26.9	21.9	48.9	223.9	183.5	508.5	692.0
Gynecology	8.7	0.0	8.7	0.0	12.6	12.6	21.3	6.8	147.1	153.9
Intensive Care Unit (ICU)	109.7	0.0	109.7	0.0	0.0	0.0	109.7	49.0	136.4	185.4
Neurology (Neuro ICU)	0.0	0.0	0.0	14.9	24.2	39.2	39.2	2.2	16.2	18.4
Neurology (Neurosurgery)	0.0	0.0	0.0	78.6	80.3	159.0	159.0	4.1	175.5	179.6
Neurology (Offices,Clinics)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Neurology (Vascular Neurology)	132.1	0.0	132.1	17.1	22.3	39.5	171.5	39.9	195.5	235.4
Nursery	11005.7	0.0	11005.7	222.7	0.0	222.7	11228.4	27.6	23.1	50.7
Obstetrics	785.2	0.0	785.2	28.1	0.0	28.1	813.3	30.9	18.8	49.7
Ophthamology/Urology	103.9	0.0	103.9	0.0	0.0	0.0	103.9	61.8	31.8	93.6
Orthopedics	0.0	0.0	0.0	5.9	123.0	128.9	128.9	127.7	64.1	191.8
Patient Check Out	0.0	189.9	189.9	0.0	0.0	0.0	189.9	85.6	407.8	493.5
Psychiatry (Beds)	0.0	0.0	0.0	11.2	52.8	64.0	64.0	0.0	331.3	331.3
Psychiatry (Offices)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	68.9	68.9
Short Stay Unit	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	17.9	18.8
Surgery (General,Thoracic)	0.0	0.0	0.0	3.9	0.0	3.9	3.9	43.1	530.3	573.4
Surgery (Plastic/General)	479.7	0.0	479.7	17.1	90.7	107.9	587.6	145.5	614.5	760.0
TOTAL	13370.2	189.9	13560.0	529.6	515.9	1045.6	14605.6	928.7	4116.5	5045.3
% of Total Patient Care General Waste	4.0	0.1	4.0	0.2	0.2	0.3	4.4	0.3	1.2	1.5

Appendix 1. OGH Annual General Waste Generation (Contd.)

Sections	Glass							Metal		
	Recyclable			Non-Recyclable			Total Glass			
	Clear Container	Amber Container	Total	Clear BoroS.	Amber BoroS.	Total		Medical	Food	Total
Patient Services Diagnostic										
Cardiopulmonary	0.0	0.0	0.0	1.6	0.0	1.6	1.6	0.0	57.0	57.0
Gastrointestinal Unit	0.0	0.0	0.0	63.3	0.0	63.3	63.3	7.3	4.3	11.6
Neurophysiology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.6	17.6
Nuclear Medicine	103.3	0.0	103.3	10.7	12.0	22.7	126.0	0.0	6.9	6.9
Obstetrics/Ultrasound	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	16.4	16.9
Ophthamology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	2.6
Radiology	307.0	0.0	307.0	355.3	0.0	355.3	662.3	13.3	349.1	362.5
TOTAL	410.4	0.0	410.4	430.9	12.0	442.9	853.3	21.2	453.9	475.1
% of Total Patient Services Diagnostic General Waste	1.2	0.0	1.2	1.3	0.0	1.3	2.6	0.1	1.4	1.4
Patient Services Service										
Biomedical Engineering	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cancer Clinic	52.3	13.0	65.4	7.1	0.0	7.1	72.5	93.8	68.0	161.8
Dialysis	70.8	0.0	70.8	0.0	0.0	0.0	70.8	184.9	148.6	333.5
Emergency	312.2	0.0	312.2	2.4	0.0	2.4	314.6	123.1	1065.0	1188.2
Fertility Clinic	49.0	0.0	49.0	0.0	0.0	0.0	49.0	0.0	90.6	90.6
Labour and Delivery	158.5	0.0	158.5	5.6	0.0	5.6	164.1	5.2	138.6	143.8
Pharmacy	108.0	0.0	108.0	1102.8	143.3	1246.1	1354.1	4.9	0.0	4.9
Recovery, Anaesthesia	92.6	0.0	92.6	0.0	0.0	0.0	92.6	0.0	10.0	10.0
Surgery	0.0	0.0	0.0	3.9	0.0	3.9	3.9	63.1	0.0	63.1
TOTAL	843.4	13.0	856.4	1121.8	143.3	1265.1	2121.5	475.1	1520.9	1996.0
% of Total Patient Services Service Total General Waste	0.7	0.0	0.7	0.9	0.1	1.0	1.7	0.4	1.2	1.6

Appendix 1. OGH Annual General Waste Generation (Contd.)

Sections	Glass							Metal		
	Recyclable			Non-Recyclable			Total Glass			
	Clear Container	Amber Container	Total	Clear BoroS.	Amber BoroS.	Total		Medical	Food	Total
Patient Services Therapeutic										
Audiology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	2.6
Occup. and Physio. Therapy	260.9	0.0	260.9	0.0	0.0	0.0	260.9	0.0	82.7	82.7
Psychology/Psychiatry Offices/Clinics	330.2	0.0	330.2	14.1	0.0	14.1	344.3	0.0	201.2	201.2
Respiratory Therapy (Office)	0.0	0.0	0.0	0.0	16.3	16.3	16.3	2.6	15.7	18.3
Social Work	266.5	0.0	266.5	0.0	0.0	0.0	266.5	0.0	77.9	77.9
Speech Therapy	62.2	0.0	62.2	0.0	0.0	0.0	62.2	0.5	4.0	4.4
TOTAL	919.8	0.0	919.8	14.1	16.3	30.4	950.2	3.0	384.1	387.1
% of Total Patient Services Therapeutic Total General Waste	4.2	0.0	4.2	0.1	0.1	0.1	4.4	0.0	1.8	1.8
Patient Services Total	2173.5	13.0	2186.6	1566.8	171.6	1738.5	3925.0	499.3	2358.9	2858.2
% of Patient Services Total General Waste	1.2	0.0	1.2	0.9	0.1	1.0	2.2	0.3	1.3	1.6
Laboratories										
Biochemistry	420.2	0.0	420.2	347.6	0.0	347.6	767.9	0.0	25.1	25.1
Blood bank	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hematology	0.0	0.0	0.0	293.2	99.3	392.5	392.5	0.0	0.0	0.0
Microbiology/Infection Control	0.0	0.0	0.0	7.3	0.0	7.3	7.3	0.0	0.0	0.0
Oncology (Cancer Lab)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	31.6	27.1	58.7
Pathology	143.9	0.0	143.9	0.0	0.0	0.0	143.9	146.9	0.0	146.9
Morgue	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.9	0.0	8.9
Research Lab	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.5	5.5
Stat Lab	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.8	19.8
TOTAL	564.1	0.0	564.1	648.2	99.3	747.5	1311.6	187.4	77.5	265.0
% of Laboratories Total General Waste	1.5	0.0	1.5	1.7	0.3	2.0	3.4	0.5	0.2	0.7

Appendix 1. OGH Annual General Waste Generation (Contd.)

Sections	Glass							Metal		
	Recyclable			Non-Recyclable			Total Glass			
	Clear Container	Amber Container	Total	Clear BoroS.	Amber BoroS.	Total		Medical	Food	Total
Administration										
Admissions	240.0	0.0	240.0	0.0	0.0	0.0	240.0	0.0	169.3	169.3
Finance, Admin, Other Offices	36.4	0.0	36.4	0.0	0.0	0.0	36.4	38.8	22.9	61.8
Health Services	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Human Resources, Other Offices	2.3	0.0	2.3	0.0	0.0	0.0	2.3	2.4	1.4	3.9
Locker Rooms	107.4	0.0	107.4	0.0	0.0	0.0	107.4	0.0	214.7	214.7
MIS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.7	28.7
Medical Records	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	15.5	15.5
Library	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Physicians Office	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.1	2.1
Physicians Office, Waiting Rm	135.6	0.0	135.6	0.0	0.0	0.0	135.6	0.0	131.0	131.0
Purchasing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.7	18.7
Residents Lodging	0.0	0.0	0.0	13.0	0.0	13.0	13.0	0.0	100.2	100.2
TOTAL	521.7	0.0	521.7	13.0	0.0	13.0	534.7	41.3	704.6	745.9
% of Administration Total General Waste	1.2	0.0	1.2	0.0	0.0	0.0	1.2	0.1	1.6	1.7

Appendix 1. OGH Annual General Waste Generation (Contd.)

Sections	Glass							Metal		
	Recyclable			Non-Recyclable			Total Glass			
	Clear Container	Amber Container	Total	Clear BoroS.	Amber BoroS.	Total		Medical	Food	Total
Support Services										
Coffee Shop	1542.6	0.0	1542.6	0.0	0.0	0.0	1542.6	0.0	308.2	308.2
Decontam	1138.2	0.0	1138.2	0.0	0.0	0.0	1138.2	0.0	0.0	0.0
Decontam (OR Waste)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Decontam (Packaging Waste)	1131.8	0.0	1131.8	0.0	0.0	0.0	1131.8	0.0	1131.8	1131.8
Dietetics	6888.9	0.0	6888.9	0.0	0.0	0.0	6888.9	0.0	17663.4	17663.4
Drug Store (Pharmacy)	0.0	0.0	0.0	0.0	134.6	134.6	134.6	0.0	0.0	0.0
Dry Cleaning	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	1.5
Engineering	0.0	955.3	955.3	0.0	0.0	0.0	955.3	226.1	120.3	346.4
Housekeeping	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Inventory Control	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.2	366.3	384.5
Receiving	0.0	0.0	0.0	0.0	0.0	0.0	0.0	124.7	34.8	159.5
SPD Office	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	58.9	58.9
Store (La Boutique)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	55.1	55.1
Telecommunication	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	43.8	43.8
TOTAL	10701.5	955.3	11656.8	0.0	134.6	134.6	11791.4	369.0	19784.1	20153.1
% of Support Services Total General Waste	2.5	0.2	2.8	0.0	0.0	0.0	2.8	0.1	4.7	4.8
Miscellaneous										
Building Exterior	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	486.2	486.2
Unidentified Building	695.1	219.1	914.2	0.0	0.0	0.0	914.2	0.0	115.0	115.0
External - Rehab. Facility	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	695.1	219.1	914.2	0.0	0.0	0.0	914.2	0.0	601.1	601.1
% of Miscellaneous Total General Waste	0.8	0.3	1.1	0.0	0.0	0.0	1.1	0.0	0.7	0.7

Appendix 1. OGH Annual General Waste Generation (Contd.)

Sections	Glass							Metal		
	Recyclable			Non-Recyclable			Total Glass			
	Clear Container	Amber Container	Total	Clear BoroS.	Amber BoroS.	Total		Medical	Food	Total
Total Whole Building	28026.1	1377.3	29403.4	2757.6	921.5	3679.1	33082.5	2025.7	27642.9	29668.6
% of Building Total General Waste	2.5	0.1	2.7	0.3	0.1	0.3	3.0	0.2	2.5	2.7
Presently Recycled										803.0
Total Generated (Disposed+Recycled)	28026.1	1377.3	29403.4	2757.6	921.5	3679.1	33082.5	2025.7	27642.9	30471.6
% of Total Generated (Overall)	2.5	0.1	2.6	0.2	0.1	0.3	2.9	0.2	2.4	2.7

Appendix 1. OGH Annual General Waste Generation (Contd.)

Sections	Food	Liquids					Misc.	Total Recyclable	Total Non-Recyclable	Total General Waste	Overall Percent
		Medical	Blood	Urine	Food	Total					
Patient Care											
Cancer Lodge	876.8	0.0	0.0	0.0	0.0	0.0	76.9	2578.7	1640.9	4219.5	0.37
Gen. Med. (Gerontology/Rheum.)	959.1	125.5	0.0	0.0	50.2	175.7	200.1	4588.5	22081.8	26670.3	2.33
Gen. Med. (Hem./Oncology)	760.8	238.9	16.0	0.0	85.1	339.9	1166.1	5787.0	14604.6	20391.6	1.78
Gen. Med. (Nephrology)	1145.3	310.0	0.0	0.0	520.8	830.8	406.3	5624.1	13123.4	18747.5	1.64
Gen. Med. (Pulmonary, Cardio)	918.0	30.5	0.0	0.0	75.3	105.8	187.2	5664.3	19867.8	25532.1	2.23
Gynecology	265.6	116.9	187.5	0.0	73.2	377.6	29.9	1541.7	8676.5	10218.3	0.89
Intensive Care Unit (ICU)	166.5	213.9	47.3	0.0	0.0	261.2	277.7	3410.9	13812.8	17223.7	1.51
Neurology (Neuro ICU)	66.8	9.2	0.0	0.0	0.0	9.2	15.6	617.6	4163.0	4780.6	0.42
Neurology (Neurosurgery)	228.0	33.6	0.0	0.0	0.0	33.6	56.2	2402.1	11301.0	13703.1	1.20
Neurology (Offices,Clinics)	11.7	0.0	0.0	0.0	0.0	0.0	0.0	1056.1	2834.2	3890.3	0.34
Neurology (Vascular Neurology)	354.5	66.9	8.0	0.0	468.3	543.2	322.8	3469.1	15256.5	18725.7	1.64
Nursery	0.0	0.9	93.5	0.0	0.0	94.4	214.3	22389.0	37237.2	59626.2	5.21
Obstetrics	968.4	178.5	0.0	0.0	398.0	576.5	171.6	5812.5	10539.0	16351.4	1.43
Ophthamology/Urology	917.1	130.1	0.0	10.2	15.3	155.6	196.0	4206.7	6932.3	11139.0	0.97
Orthopedics	336.8	52.5	104.9	0.0	65.6	223.0	154.4	2691.8	11589.2	14281.0	1.25
Patient Check Out	3391.6	5551.6	0.0	0.0	0.0	5551.6	814.9	5205.8	15447.1	20652.9	1.81
Psychiatry (Beds)	711.4	35.1	0.0	0.0	123.8	158.9	126.4	2628.7	6336.1	8964.7	0.78
Psychiatry (Offices)	441.2	0.0	0.0	0.0	0.0	0.0	17.9	1943.3	1312.8	3256.0	0.28
Short Stay Unit	46.4	27.1	0.0	0.0	0.0	27.1	0.0	401.0	300.5	701.5	0.06
Surgery (General,Thoracic)	499.4	79.0	0.0	0.0	0.0	79.0	331.3	6920.5	11243.4	18163.9	1.59
Surgery (Plastic/General)	807.6	53.6	13.4	0.0	200.1	267.1	236.1	6194.0	12303.0	18497.0	1.62
TOTAL	13873.0	7253.7	470.7	10.2	2075.7	9810.3	5001.7	95133.1	240603.1	335736.2	29.53
% of Total Patient Care General Waste	4.1	2.2	0.1	0.0	0.6	2.9	1.5	28.3	71.7	100.0	

Appendix 1. OGH Annual General Waste Generation (Contd.)

Sections	Food	Liquids					Misc.	Total Recyclable	Total Non-Recyclable	Total General Waste	Overall Percent
		Medical	Blood	Urine	Food	Total					
Patient Services Diagnostic											
Cardiopulmonary	92.1	32.6	0.0	34.9	24.6	92.1	108.3	2098.8	1091.9	3190.7	0.28
Gastrointestinal Unit	168.9	207.2	2.3	0.0	0.0	209.5	0.0	607.6	3465.3	4072.9	0.36
Neurophysiology	184.9	2.7	0.0	0.0	1.4	4.1	70.3	3426.6	473.5	3900.2	0.34
Nuclear Medicine	0.0	0.0	0.0	0.0	0.0	0.0	7.3	392.1	218.1	610.1	0.05
Obstetrics/Ultrasound	26.8	0.0	0.0	0.0	0.0	0.0	32.6	1045.8	2680.7	3726.5	0.33
Ophthamology	61.3	5.4	0.0	0.0	0.0	5.4	0.0	852.7	582.7	1435.4	0.13
Radiology	504.7	236.8	11.1	0.0	0.0	247.8	1066.1	9139.1	7328.4	16467.5	1.44
TOTAL	1038.7	484.7	13.4	34.9	25.9	558.9	1284.6	17562.7	15840.6	33403.3	2.92
% of Total Patient Services Diagnostic General Waste	3.1	1.5	0.0	0.1	0.1	1.7	3.8	52.6	47.4	100.0	
Patient Services Service											
Biomedical Engineering	0.0	0.0	0.0	0.0	0.0	0.0	7.7	65.0	121.1	186.1	0.02
Cancer Clinic	841.3	20.3	15.9	0.0	102.1	138.3	2889.7	5479.0	8102.3	13581.3	1.19
Dialysis	565.9	1692.3	0.0	0.0	0.0	1692.3	346.0	6592.7	20449.8	27042.5	2.36
Emergency	549.0	2451.3	0.0	0.0	0.0	2451.3	1279.4	8388.0	28667.8	37055.8	3.24
Fertility Clinic	124.2	0.0	0.0	0.0	3.0	3.0	3.6	790.9	511.3	1302.2	0.11
Labour and Delivery	382.5	122.3	0.0	28.8	0.0	151.2	93.4	4666.8	10967.9	15634.7	1.37
Pharmacy	18.0	597.2	0.0	0.0	0.0	597.2	11.5	3689.2	5835.1	9524.3	0.83
Recovery, Anaesthesia	8.8	324.7	23.6	0.0	0.0	348.3	69.1	1889.7	4063.3	5953.1	0.52
Surgery	0.0	10.5	12.6	0.0	0.0	23.1	11.1	2647.0	11608.6	14255.5	1.25
TOTAL	2489.6	5218.6	52.1	28.8	105.2	5404.7	4711.5	34208.2	90327.3	124535.5	10.89
% of Total Patient Services Service Total General Waste	2.0	4.2	0.0	0.0	0.1	4.3	3.8	27.5	72.5	100.0	

Appendix 1. OGH Annual General Waste Generation (Contd.)

Sections	Food	Liquids					Misc.	Total Recyclable	Total Non-Recyclable	Total General Waste	Overall Percent
		Medical	Blood	Urine	Food	Total					
Patient Services Therapeutic											
Audiology	3.8	0.0	0.0	0.0	0.0	0.0	0.0	325.9	353.6	679.4	0.06
Occup. and Physio. Therapy	529.6	0.0	0.0	0.0	0.0	0.0	125.9	1788.3	1328.4	3116.7	0.27
Psychology/Psychiatry Offices/Clinics	419.8	0.0	0.0	0.0	0.0	0.0	126.2	7886.8	2961.3	10848.1	0.95
Respiratory Therapy (Office)	59.3	0.0	0.0	0.0	0.0	0.0	30.8	749.3	263.5	1012.9	0.09
Social Work	562.7	0.0	0.0	0.0	0.0	0.0	0.0	5208.7	514.1	5722.8	0.50
Speech Therapy	17.6	0.0	0.0	0.0	0.0	0.0	4.4	217.7	74.9	292.7	0.03
TOTAL	1592.8	0.0	0.0	0.0	0.0	0.0	287.2	16176.6	5495.8	21672.5	1.90
% of Total Patient Services Therapeutic	7.3	0.0	0.0	0.0	0.0	0.0	1.3	74.6	25.4	100.0	
Total General Waste											
Patient Services Total	5121.1	5703.3	65.5	63.8	131.1	5963.6	6283.4	67947.5	111663.7	179611.2	15.71
% of Patient Services Total General Waste	2.9	3.2	0.0	0.0	0.1	3.3	3.5	37.8	62.2	100.0	
Laboratories											
Biochemistry	202.7	212.1	0.0	0.0	0.0	212.1	292.1	4922.2	3940.8	8863.0	0.78
Blood bank	0.0	0.0	0.0	0.0	0.0	0.0	10.7	157.7	427.0	584.7	0.05
Hematology	25.0	0.0	0.0	0.0	0.0	0.0	486.2	2921.9	5429.7	8351.5	0.73
Microbiology/Infection Control	0.0	0.0	0.0	0.0	0.0	0.0	10.8	5431.6	2452.6	7884.2	0.69
Oncology (Cancer Lab)	43.1	0.0	0.0	0.0	13.0	13.0	35.7	645.2	1045.7	1690.8	0.15
Pathology	0.0	0.0	0.0	0.0	0.0	0.0	13.2	2207.1	1657.6	3864.7	0.34
Morgue	0.0	0.0	0.0	0.0	0.0	0.0	130.5	611.0	691.9	1302.8	0.11
Research Lab	46.8	0.0	0.0	0.0	0.0	0.0	0.0	217.2	648.0	865.2	0.08
Stat Lab	290.5	0.0	0.0	0.0	0.0	0.0	236.7	3164.0	1512.0	4676.0	0.41
TOTAL	608.0	212.1	0.0	0.0	13.0	225.1	1215.8	20277.9	17805.2	38083.1	3.33
% of Laboratories Total General Waste	1.6	0.6	0.0	0.0	0.0	0.6	3.2	53.2	46.8	100.0	

Appendix 1. OGH Annual General Waste Generation (Contd.)

Sections	Food	Liquids					Misc.	Total Recyclable	Total Non-Recyclable	Total General Waste	Overall Percent
		Medical	Blood	Urine	Food	Total					
Administration											
Admissions	316.8	0.0	0.0	0.0	0.0	0.0	56.8	10624.4	1659.3	12283.7	1.07
Finance, Admin, Other Offices	129.2	0.0	0.0	0.0	0.0	0.0	30.5	2359.3	3082.2	5441.4	0.48
Health Services	0.0	0.0	0.0	0.0	0.0	0.0	2.1	179.6	70.7	250.4	0.02
Human Resources, Other Offices	8.1	0.0	0.0	0.0	0.0	0.0	1.9	142.5	193.4	335.9	0.03
Locker Rooms	78.4	0.0	0.0	0.0	33.5	33.5	326.0	1073.6	865.6	1939.2	0.17
MIS	90.1	0.0	0.0	0.0	0.0	0.0	81.8	4534.3	339.2	4873.6	0.43
Medical Records	41.9	0.0	0.0	0.0	1.4	1.4	1.0	4263.3	182.2	4445.5	0.39
Library	16.8	0.0	0.0	0.0	0.0	0.0	5.5	147.7	69.9	217.5	0.02
Physicians Office	25.7	0.0	0.0	0.0	1.1	1.1	0.0	48.7	13.5	62.1	0.01
Physicians Office, Waiting Rm	550.7	0.0	0.0	0.0	10.7	10.7	88.9	3815.4	2820.2	6635.6	0.58
Purchasing	127.8	0.0	0.0	0.0	35.2	35.2	146.0	1895.0	780.5	2675.5	0.23
Residents Lodging	671.0	0.0	0.0	0.0	0.0	0.0	58.9	2451.7	1255.8	3707.5	0.32
TOTAL	2056.5	0.0	0.0	0.0	81.9	81.9	799.5	31535.3	11332.7	42868.0	3.75
% of Administration Total General Waste	4.8	0.0	0.0	0.0	0.2	0.2	1.9	73.6	26.4	100.0	

Appendix 1. OGH Annual General Waste Generation (Contd.)

Sections	Food	Liquids					Misc.	Total Recyclable	Total Non-Recyclable	Total General Waste	Overall Percent
		Medical	Blood	Urine	Food	Total					
Support Services											
Coffee Shop	7246.4	0.0	0.0	0.0	0.0	0.0	395.5	12259.7	3641.0	15900.7	1.39
Decontam	117143.4	0.0	0.0	0.0	42443.2	42443.2	835.6	133233.6	43556.0	176789.6	15.46
Decontam (OR Waste)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7545.5	7545.5	0.66
Decontam (Packaging Waste)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5659.1	5659.1	11318.2	0.99
Dietetics	51902.5	0.0	0.0	0.0	464.7	464.7	1456.6	135364.7	12101.5	147466.1	12.90
Drug Store (Pharmacy)	3.3	0.0	0.0	0.0	0.0	0.0	32.9	82.2	327.6	409.8	0.04
Dry Cleaning	0.0	0.0	0.0	0.0	1.5	1.5	19.1	16.0	30.9	46.9	0.00
Engineering	263.1	0.0	0.0	0.0	0.0	0.0	284.1	3756.6	1170.7	4927.2	0.43
Housekeeping	0.0	0.0	0.0	0.0	0.0	0.0	238.6	361.8	238.6	600.3	0.05
Inventory Control	777.4	0.0	0.0	0.0	0.0	0.0	271.1	32542.9	3015.8	35558.7	3.11
Receiving	8.3	0.0	0.0	0.0	0.0	0.0	67.5	11064.6	429.7	11494.3	1.01
SPD Office	120.9	0.0	0.0	0.0	0.0	0.0	37.3	1399.0	478.9	1877.8	0.16
Store (La Boutique)	9.4	0.0	0.0	0.0	0.0	0.0	0.0	2742.8	29.1	2772.0	0.24
Telecommunication	43.8	0.0	0.0	0.0	0.0	0.0	43.8	3336.4	1428.5	4764.9	0.42
TOTAL	177518.5	0.0	0.0	0.0	42909.4	42909.4	3682.0	341819.3	79652.8	421472.0	36.86
% of Support Services Total General Waste	42.1	0.0	0.0	0.0	10.2	10.2	0.9	81.1	18.9	100.0	
Miscellaneous											
Building Exterior	0.0	0.0	0.0	0.0	0.0	0.0	3325.0	756.9	3685.3	4442.2	0.39
Unidentified Building	0.0	0.0	23.4	0.0	0.0	23.4	36079.1	24684.6	37112.8	61797.4	5.40
External - Rehab. Facility	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17926.8	0.0	17926.8	1.57
TOTAL	0.0	0.0	23.4	0.0	0.0	23.4	39404.0	43368.3	40798.1	84166.4	7.36
% of Miscellaneous Total General Waste	0.0	0.0	0.0	0.0	0.0	0.0	46.8	51.5	48.5	100.0	

Appendix 1. OGH Annual General Waste Generation (Contd.)

Sections	Food	Liquids					Misc.	Total Recyclable	Total Non-Recyclable	Total General Waste	Overall Percent
		Medical	Blood	Urine	Food	Total					
Total Whole Building	199177.1	13169.2	559.5	74.0	45211.1	59013.8	56386.4	600081.5	501855.5	1101937.0	96.36
% of Building Total General Waste	18.1	1.2	0.1	0.0	4.1	5.4	5.1	54.5	45.5	100.0	
Presently Recycled							32400.0 (pallets)	9182.0	32400.0	41582.0	3.64
Total Generated (Disposed+Recycled)	199177.1	13169.2	559.5	74.0	45211.1	59013.8	88786.4	609263.5	534255.5	1143519.0	100.00
% of Total Generated (Overall)	17.4	1.2	0.0	0.0	4.0	5.2	7.8	53.3	46.7	100.0	

Appendix 1. OGH Annual Biomedical Waste Generation (kg/yr)

Sections	Sharps Container Wastes	Non-Anatomical Infectious Wastes	Sub Total	Anatomical Wastes	Cytotoxic Wastes	Sub Total	Total Biomedical Wastes	Overall Percent
Patient Care								
Cancer Lodge	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Gen. Med. (Gerontology/Rheum.)	615.1	0.0	615.1	142.0	0.0	142.0	757.1	1.15
Gen. Med. (Hem./Oncology)	980.3	363.9	1344.2	0.0	259.9	259.9	1604.1	2.43
Gen. Med. (Nephrology)	1628.3	131.1	1759.4	0.0	0.0	0.0	1759.4	2.67
Gen. Med. (Pulmonary, Cardio)	513.0	1015.7	1528.7	282.3	0.0	282.3	1811.0	2.74
Gynecology	215.3	65.8	281.1	0.0	0.0	0.0	281.1	0.43
Intensive Care Unit (ICU)	2080.8	0.0	2080.8	0.0	0.0	0.0	2080.8	3.15
Neurology (Neuro ICU)	470.7	0.0	470.7	158.9	0.0	158.9	629.6	0.95
Neurology (Neurosurgery)	180.0	1293.1	1473.0	0.0	0.0	0.0	1473.0	2.23
Neurology (Offices,Clinics)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Neurology (Vascular Neurology)	727.3	0.0	727.3	0.0	0.0	0.0	727.3	1.10
Nursery	806.9	0.0	806.9	0.0	0.0	0.0	806.9	1.22
Obstetrics	429.0	0.0	429.0	0.0	0.0	0.0	429.0	0.65
Ophthamology/Urology	575.3	41.1	616.4	0.0	41.1	41.1	657.5	1.00
Orthopedics	310.1	0.0	310.1	0.0	0.0	0.0	310.1	0.47
Patient Check Out	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Psychiatry (Beds)	76.8	0.0	76.8	0.0	0.0	0.0	76.8	0.12
Psychiatry (Offices)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Short Stay Unit	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Surgery (General,Thoracic)	1086.9	0.0	1086.9	0.0	0.0	0.0	1086.9	1.65
Surgery (Plastic/General)	1208.3	0.0	1208.3	0.0	0.0	0.0	1208.3	1.83
TOTAL	11903.9	2910.8	14814.688	583.2	301.0	884.2	15698.9	23.79
% of Total Patient Care Biomedical Waste	75.8	18.5	94.4	3.7	1.9	5.6	100.0	0.15

Appendix 1. OGH Annual Biomedical Waste Generation (kg/yr)

Sections	Sharps Container Wastes	Non-Anatomical Infectious Wastes	Sub Total	Anatomical Wastes	Cytotoxic Wastes	Sub Total	Total Biomedical Wastes	Overall Percent
Patient Services Diagnostic								
Cardiopulmonary	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Gastrointestinal Unit .	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Neurophysiology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Nuclear Medicine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Obstetrics/Ultrasound	526.5	0.0	526.5	0.0	0.0	0.0	526.5	0.80
Ophthamology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Radiology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
TOTAL	526.5	0.0	526.5	0.0	0.0	0.0	526.5	0.80
% of Total Patient Services Diagnostic Biomedical Waste	100.0	0.0	100.0	0.0	0.0	0.0	100.0	0.15
Patient Services Service								
Biomedical Engineering	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Cancer Clinic	0.0	2144.6	2144.6	0.0	0.0	0.0	2144.6	3.25
Dialysis	278.4	0.0	278.4	0.0	0.0	0.0	278.4	0.42
Emergency	1173.1	0.0	1173.1	0.0	0.0	0.0	1173.1	1.78
Fertility Clinic	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Labour and Delivery	300.2	0.0	300.2	1361.0	0.0	1361.0	1661.2	2.52
Pharmacy	1432.2	827.6	2259.8	0.0	614.0	614.0	2873.8	4.36
Recovery, Anaesthesia	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Surgery	0.0	0.0	0.0	1126.5	0.0	1126.5	1126.5	1.71
TOTAL	3184.0	2972.2	6156.2	2487.6	614.0	3101.5	9257.7	14.03
% of Total Patient Services Service Biomedical Waste	34.4	32.1	66.5	26.9	6.6	33.5	100.0	0.15

Appendix 1. OGH Annual Biomedical Waste Generation (kg/yr)

Sections	Sharps Container Wastes	Non-Anatomical Infectious Wastes	Sub Total	Anatomical Wastes	Cytotoxic Wastes	Sub Total	Total Biomedical Wastes	Overall Percent
Patient Services Therapeutic								
Audiology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Occup. and Physio. Therapy	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Psychology/Psychiatry Offices/Clinics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Respiratory Therapy (Office)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Social Work	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Speech Therapy	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
% of Total Patient Services Therapeutic Biomedical Waste	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Patient Services Total	3710.5	2972.2	6682.7	2487.6	614.0	3101.6	9784.3	14.83
% of Total Patient Services Biomedical Waste	37.9	30.4	68.3	25.4	6.3	31.7	100.0	0.15
Laboratories								
Biochemistry	2212.6	0.0	2212.6	0.0	0.0	0.0	2212.6	3.35
Blood bank	4638.4	1199.4	5837.8	0.0	0.0	0.0	5837.8	8.85
Hematology	766.6	844.6	1611.2	0.0	0.0	0.0	1611.2	2.44
Microbiology/Infection Control	4990.4	6662.6	11652.9	0.0	0.0	0.0	11652.9	17.66
Oncology (Cancer Lab)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Pathology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Morgue	0.0	829.9	829.9	3586.7	0.0	3586.7	4416.6	6.69
Research Lab	0.0	1199.6	1199.6	0.0	0.0	0.0	1199.6	1.82
Stat Lab	1233.2	0.0	1233.2	0.0	0.0	0.0	1233.2	1.87
TOTAL	13841.2	10736.1	24577.3	3586.7	0.0	3586.7	28164.0	42.68
% of Total Laboratories Biomedical Waste	49.1	38.1	87.3	12.7	0.0	12.7	100.0	0.15

Appendix 1. OGH Annual Biomedical Waste Generation (kg/yr)

Sections	Sharps Container Wastes	Non-Anatomical Infectious Wastes	Sub Total	Anatomical Wastes	Cytotoxic Wastes	Sub Total	Total Biomedical Wastes	Overall Percent
Administration								
Human Resources, Other Offices	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
MIS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Medical Records	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Library	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Physicians Office	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Physicians Office, Waiting Rm	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Purchasing	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Residents Lodging	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Admissions	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Finance, Admin, Other Offices	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Locker Rooms	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Health Services	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
TOTAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
% of Total Administration Biomedical Waste	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00

Appendix 1. OGH Annual Biomedical Waste Generation (kg/yr)

Sections	Sharps Container Wastes	Non Anatomical Infectious Wastes	Sub Total	Anatomical Wastes	Cytotoxic Wastes	Sub Total	Total Biomedical Wastes	Overall Percent
Support Services								
Dietetics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Engineering	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Housekeeping	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Receiving	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Inventory Control	284.9	0.0	284.9	0.0	0.0	0.0	284.9	0.43
SPD Office	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Decontam	1691.6	0.0	1691.6	0.0	0.0	0.0	1691.6	2.56
Decontam (Packaging Waste)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Decontam (OR Waste)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Telecommunication	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Coffee Shop	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Drug Store (Pharmacy)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Dry Cleaning	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Store (La Boutique)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
TOTAL	1976.4	0.0	1976.4	0.0	0.0	0.0	1976.4	3.00
% of Total Support Services Biomedical Waste	100.0	0.0	100.0	0.0	0.0	0.0	100.0	0.15
Miscellaneous								
Building Exterior	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Unidentified Building	6330.0	1439.2	7769.1	657.0	0.0	657.0	8426.1	12.77
External - Rehab. Facility	0.0	1934.0	1934.0	0.0	0.0	0.0	1934.0	2.93
TOTAL	6330.0	3373.1	9703.1	657.0	0.0	657.0	10360.1	15.70
% of Total Miscellaneous Biomedical Waste	61.1	32.6	93.7	6.3	0.0	6.3	100.0	0.15

Appendix 1. OGH Annual Biomedical Waste Generation (kg/yr)

Sections	Sharps Container Wastes	Non-Anatomical Infectious Wastes	Sub Total	Anatomical Wastes	Cytotoxic Wastes	Sub Total	Total Biomedical Wastes	Overall Percent
Total Whole Building	37761.9	17883.8	55645.7	7314.5	915.0	8229.5	65983.6	100.00
Percent (Overall)	57.2	27.1	84.3	11.1	1.4	12.5	100.0	0.15
Presently Recycled	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00
Total Generated (Disposed+Recycled)	37761.9	19990.4	57752.4	7314.5	915.0	8229.4	65983.6	100.00
Percent (Overall)	57.2	30.3	87.5	11.1	1.4	12.5	100.0	

APPENDIX 2: Annual General Waste Generation per Activity Descriptor (kg/yr/activity Descriptor)

(Activity indicators developed for use by OGH. This is the only data available to date at this level of detail.)

Appendix 2. OGH Annual Waste Generation per Activity (kg/yr/Activity Descriptor)

Sections	Activity Descriptor	Activity Level	Paper						
			Potentially Recyclable						
			Boxboard	CPO	Fine	Kraft	Newspaper	OCC	Total
Patient Care									
Cancer Lodge	Beds	17.8	21.7	0.0	8.4	1.3	20.3	0.0	51.8
Gen. Med. (Gerontology/Rheum.)	Beds	40.6	10.6	3.1	11.6	0.0	6.2	20.7	52.4
Gen. Med. (Hem./Oncology)	Beds	33	13.0	6.2	10.0	1.1	17.1	37.7	85.1
Gen. Med. (Nephrology)	Beds	35	7.8	7.1	13.2	0.9	11.7	37.2	77.9
Gen. Med. (Pulmonary, Cardio)	Beds	41.3	11.4	1.5	5.2	0.0	18.1	24.4	60.7
Gynecology	Beds	33.6	3.1	0.3	4.8	0.0	2.1	0.1	10.5
Intensive Care Unit (ICU)	Beds	15.3	54.0	45.7	14.0	0.0	3.9	38.8	156.4
Neurology (Neuro ICU)	Beds	8	10.7	0.0	1.0	0.0	0.0	15.7	27.4
Neurology (Neurosurgery)	Beds	38.8	7.9	2.2	1.8	0.2	2.1	10.6	24.8
Neurology (Offices,Clinics)	Staff	6	2.2	0.0	97.6	0.0	0.0	70.7	170.4
Neurology (Vascular Neurology)	Beds	32	15.0	3.3	4.5	1.0	11.8	24.2	59.8
Nursery	Beds	46.2	14.4	0.8	2.9	0.2	0.0	204.6	222.9
Obstetrics	Beds	49.5	8.2	0.0	3.7	0.0	27.3	6.1	45.3
Ophthamology/Urology	Beds	26.9	20.9	3.1	12.4	2.4	39.5	2.3	80.5
Orthopedics	Beds	39.8	10.8	3.9	6.9	0.0	7.8	2.5	31.8
Patient Check Out	Beds	52.3	6.6	0.0	4.0	0.0	0.0	0.0	10.6
Psychiatry (Beds)	Beds	46.3	1.5	0.0	4.2	0.0	5.6	2.3	13.5
Psychiatry (Offices)	Offices	43	0.9	3.1	24.5	0.3	0.0	0.0	28.8
Short Stay Unit	Beds	11.7	3.5	0.4	8.2	0.0	10.3	0.0	22.2
Surgery (General,Thoracic)	Beds	33.3	10.3	7.2	50.2	2.4	42.4	42.6	155.1
Surgery (Plastic/General)	Beds	32.5	13.8	5.3	6.9	1.9	27.9	42.0	97.7

Appendix 2. OGH Annual Waste Generation per Activity (Contd.)

Sections	Activity Descriptor	Activity Level	Paper Potentially Recyclable						
			Boxboard	CPO	Fine	Kraft	Newspaper	OCC	Total
Patient Services Diagnostic									
Cardiopulmonary	1000 Proc.	62.4	1.1	1.5	22.5	0.0	1.3	1.2	27.6
Gastrointestinal Unit	1000 Proc.	2.958	42.9	20.1	16.3	1.9	0.0	0.0	81.3
Neurophysiology	1000 Patients	7.15	3.6	408.2	16.1	0.3	0.0	0.5	428.7
Nuclear Medicine	1000 Patients	6	5.1	2.8	25.4	0.0	9.0	0.0	42.3
Obstetrics/Ultrasound	1000 Patients	12	14.1	0.0	27.4	0.7	0.0	8.6	50.7
Ophthamology	1000 Patients	19.911	4.5	0.2	17.3	0.0	0.0	13.5	35.6
Radiology	1000 Exams	130.485	5.3	10.6	22.7	1.6	5.5	4.7	50.4
Patient Services Service									
Biomedical Engineering	1000 Repairs	15.36	1.3	0.0	0.3	0.0	0.0	1.3	2.9
Cancer Clinic	1000 Patients	46.8	16.5	1.5	35.6	1.0	2.2	15.2	71.9
Dialysis	1000 Patients	10.92	98.1	0.0	12.4	0.0	9.2	333.3	453.1
Emergency	1000 Patients	53.691	21.7	8.9	38.1	1.5	2.3	13.0	85.5
Fertility Clinic	1000 Patients	7.28	11.8	1.0	34.5	0.6	0.0	0.0	47.9
Labour and Delivery	1000 Deliveries	3.509	153.5	0.0	221.2	0.0	177.5	355.0	907.2
Pharmacy	1000 Doses	2190	0.1	0.0	0.0	0.0	0.0	1.5	1.5
Recovery, Anaesthesia	1000 Operations	13	13.7	1.4	62.0	0.0	3.8	8.5	89.4
Surgery	1000 Operations	13	106.9	0.0	6.9	0.0	0.0	84.8	198.6
Patient Services Therapeutic									
Audiology	1000 Proc.	8.735	3.0	0.0	28.9	0.0	0.0	0.0	31.9
Occup. and Physio. Therapy	1000 Patients	25.151	1.0	1.5	14.0	0.5	0.2	8.3	25.4
Psychology/Psychiatry Offices/Clinics	1000 Patients	10.858	39.3	7.6	459.9	3.9	43.4	38.6	592.7
Respiratory Therapy (Office)	Staff	35	2.5	0.0	2.6	0.2	0.0	11.6	16.8
Social Work	Staff	10.33	10.2	40.1	258.7	0.0	0.0	73.4	382.4
Speech Therapy	1000 Patients	2.679	18.0	2.7	24.7	0.0	0.0	0.0	45.4

Appendix 2. OGH Annual Waste Generation per Activity (Contd.)

Sections	Activity Descriptor	Activity Level	Paper Potentially Recyclable						
			Boxboard	CPO	Fine	Kraft	Newspaper	OCC	Total
Laboratories									
Biochemistry	1000 Samples	920	0.3	0.5	0.3	0.0	0.7	2.1	3.9
Blood bank	1000 Samples	157	0.0	0.0	0.3	0.0	0.0	0.6	0.9
Hematology	1000 Samples	342	0.8	1.8	0.8	0.0	0.0	3.4	6.8
Microbiology/Infection Control	1000 Samples	52	3.0	31.6	37.2	0.0	0.0	26.0	97.8
Oncology (Cancer Lab)	Staff	11.5	5.1	5.4	9.7	1.4	6.8	10.0	38.3
Pathology	1000 Oper.	13	36.3	0.0	5.8	1.7	0.0	79.9	123.7
Morgue	Autopsies	250	0.3	0.0	0.0	0.0	0.0	1.0	1.3
Research Lab	Staff	14.5	0.0	0.0	0.4	0.0	0.0	5.8	6.2
Stat Lab	Staff	3	19.4	691.6	19.7	29.6	32.6	82.0	874.9
Administration									
Admissions	1000 Patients	22	4.3	355.6	46.4	0.0	0.0	39.7	446.0
Finance, Admin, Other Offices	Staff	39	0.1	6.7	34.3	0.0	3.0	7.6	51.7
Health Services	Staff	3.5	0.4	0.0	34.6	3.1	0.0	0.0	38.1
Human Resources, Other Offices	Staff	36.7	0.0	0.4	2.3	0.0	0.2	0.4	3.3
Locker Rooms	Staff	3421	0.0	0.0	0.1	0.0	0.0	0.0	0.1
MIS	Staff	57.34	0.1	14.2	5.1	0.1	0.1	54.3	73.9
Medical Records	Staff	52	0.1	0.1	72.6	0.0	2.7	4.9	80.4
Library	Staff	1	1.0	3.5	65.1	0.0	29.4	15.7	114.7
Physicians Office	Staff	80	0.0	0.0	0.1	0.0	0.0	0.0	0.2
Physicians Office, Waiting Rm	Staff	80	1.7	0.1	26.2	0.2	4.6	0.4	33.3
Purchasing	Staff	13	3.8	74.8	44.5	1.8	0.0	0.0	124.9
Residents Lodging	Beds	17	17.4	0.0	6.7	1.1	16.3	28.1	69.6

Appendix 2. OGH Annual Waste Generation per Activity (Contd.)

Sections	Activity Descriptor	Activity Level	Paper						
			Potentially Recyclable						
			Boxboard	CPO	Fine	Kraft	Newspaper	OCC	Total
Support Services									
Coffee Shop	Staff	4	0.0	0.0	88.3	53.6	40.1	16.9	198.9
Decontam	1000 meals	2076.85	0.7	0.0	0.0	0.0	0.0	1.2	1.8
Decontam (OR Waste)	1000 Oper	13	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Decontam (Packaging Waste)	1000 meals	2076.85	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dietetics	1000 meals	2076.85	1.7	0.0	0.0	0.3	0.3	21.4	23.7
Drug Store (Pharmacy)	Staff	35.75	1.1	0.0	0.5	0.0	0.3	0.0	2.0
Dry Cleaning	Staff	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Engineering	Staff	55.62	18.2	0.8	1.1	0.5	0.0	16.3	36.9
Housekeeping	Staff	120	0.8	0.0	0.0	0.0	0.4	1.0	2.2
Inventory Control	Staff	6	156.6	34.3	933.7	0.0	39.8	3799.0	4963.4
Receiving	Staff	4	1330.8	4.0	27.6	69.9	21.4	997.8	2451.5
SPD Office	Staff	3	13.8	11.0	283.0	0.0	12.8	0.0	320.7
Store (La Boutique)	Staff	3	124.6	30.7	0.0	0.0	696.3	0.0	851.7
Telecommunication	Staff	50.73	0.0	0.0	17.7	0.0	0.0	42.1	59.7

Appendix 2. OGH Annual Waste Generation per Activity (Contd.)

Sections	Activity Descriptor	Activity Level	Paper								Total Paper
			Potentially Non-Recyclable								
			Diapers	Incont-inents	Under pads	Non Recyclable	Wet Paper and Gauze	Medical Sterile Pack.	Hair nets Boots etc	Total	
Patient Care											
Cancer Lodge	Beds	17.8	0.0	0.0	0.0	40.4	43.9	0.0	2.7	86.9	138.7
Gen. Med. (Gerontology/Rheum.)	Beds	40.6	0.0	323.4	58.1	12.9	88.9	10.1	0.2	493.6	545.9
Gen. Med. (Hem./Oncology)	Beds	33	0.0	40.6	54.0	12.2	111.1	44.2	3.0	265.1	350.2
Gen. Med. (Nephrology)	Beds	35	0.0	42.2	35.7	24.5	103.2	10.9	0.9	217.3	295.2
Gen. Med. (Pulmonary, Cardio)	Beds	41.3	0.0	273.2	10.3	14.1	89.1	10.3	0.8	397.8	458.4
Gynecology	Beds	33.6	0.0	134.9	19.8	7.4	44.0	6.2	0.0	212.4	222.8
Intensive Care Unit (ICU)	Beds	15.3	0.0	61.3	135.8	2.7	181.5	58.4	5.8	445.5	601.9
Neurology (Neuro ICU)	Beds	8	0.0	249.9	47.3	8.5	113.6	10.1	1.3	430.7	458.1
Neurology (Neurosurgery)	Beds	38.8	0.0	123.6	21.4	8.1	72.7	6.3	0.6	232.7	257.5
Neurology (Offices,Clinics)	Staff	6	0.0	0.0	0.0	472.4	0.0	0.0	0.0	472.4	642.8
Neurology (Vascular Neurology)	Beds	32	38.4	114.6	69.0	11.2	100.9	15.7	0.7	350.5	410.3
Nursery	Beds	46.2	603.5	0.0	0.0	1.1	56.8	29.3	0.4	691.1	914.0
Obstetrics	Beds	49.5	3.3	11.5	39.3	6.6	94.0	7.1	0.0	161.8	207.0
Ophthamology/Urology	Beds	26.9	0.0	0.0	36.9	18.3	82.7	11.1	0.2	149.2	229.7
Orthopedics	Beds	39.8	0.0	34.7	69.9	12.0	78.0	9.2	2.4	206.2	238.0
Patient Check Out	Beds	52.3	0.0	0.0	43.8	3.3	51.2	6.2	0.0	104.5	115.1
Psychiatry (Beds)	Beds	46.3	0.0	78.0	4.2	15.4	20.3	1.8	0.4	120.1	133.6
Psychiatry (Offices)	Offices	43	0.0	0.0	0.0	18.1	11.9	0.0	0.0	30.0	58.7
Short Stay Unit	Beds	11.7	0.0	0.0	5.7	1.8	5.2	1.8	1.9	16.4	38.6
Surgery (General,Thoracic)	Beds	33.3	0.0	82.2	17.6	14.6	97.7	6.8	0.0	218.8	373.9
Surgery (Plastic/General)	Beds	32.5	0.0	35.8	35.4	11.9	134.2	24.1	1.5	242.8	340.5

Appendix 2. OGH Annual Waste Generation per Activity (Contd.)

Section	Activity Descriptor	Activity Level	Paper								Total Paper
			Potentially Non-Recyclable								
			Diapers	Incont-inents	Under pads	Non Recyclable	Wet Paper and Gauze	Medical Sterile Pack.	Hair nets Boots etc	Total	
Patient Services Diagnostic											
Cardiopulmonary	1000 Proc.	62.4	0.0	0.0	0.0	1.7	4.6	0.8	0.0	7.1	34.7
Gastrointestinal Unit	1000 Proc.	2.958	0.0	0.0	14.5	28.9	231.3	121.3	0.9	396.9	478.1
Neurophysiology	1000 Patients	7.15	0.0	2.6	0.0	13.0	28.2	3.5	0.0	47.2	476.0
Nuclear Medicine	1000 Patients	6	0.0	0.0	0.0	4.9	4.8	5.5	0.0	15.2	57.5
Obstetrics/Ultrasound	1000 Patients	12	0.0	0.0	3.1	51.5	96.7	18.9	0.0	170.2	220.9
Ophthamology	1000 Patients	19.911	0.0	0.0	0.0	4.8	14.3	1.8	0.0	20.9	56.5
Radiology	1000 Exams	130.485	0.4	0.0	3.6	5.6	10.2	2.5	0.2	22.5	72.9
Patient Services Service											
Biomedical Engineering	1000 Repairs	15.36	0.0	0.0	0.0	2.4	4.8	0.2	0.0	7.4	10.2
Cancer Clinic	1000 Patients	46.8	0.0	0.0	6.5	48.4	27.0	5.3	0.4	87.6	159.5
Dialysis	1000 Patients	10.92	0.0	0.0	30.5	10.2	404.5	136.5	60.0	641.6	1094.6
Emergency	1000 Patients	53.691	0.0	1.4	38.9	70.3	181.1	23.3	0.1	315.1	400.7
Fertility Clinic	1000 Patients	7.28	0.0	0.0	0.0	33.8	21.8	9.3	0.0	64.8	112.8
Labour and Delivery	1000 Deliveries	3.509	0.0	0.0	386.0	516.3	909.0	268.3	83.4	2163.0	3070.2
Pharmacy	1000 Doses	2190	0.0	0.0	0.0	0.1	0.1	0.2	0.0	0.4	1.9
Recovery, Anaesthesia	1000 Operations	13	0.0	0.0	13.6	7.3	34.1	20.4	15.8	91.2	180.6
Surgery	1000 Operations	13	0.0	0.0	38.2	2.1	261.1	92.9	0.0	394.3	592.9
Patient Services Therapeutic											
Audiology	1000 Proc.	8.735	0.0	0.0	0.0	7.4	23.4	2.9	0.0	33.7	65.6
Occup. and Physio. Therapy	1000 Patients	25.151	0.0	0.0	0.0	12.8	33.0	0.1	0.6	46.5	71.9
Psychology/Psychiatry Offices/Clinics	1000 Patients	10.858	0.0	0.0	0.0	179.6	59.7	0.0	0.0	239.3	832.1
Respiratory Therapy (Office)	Staff	35	0.0	0.0	0.0	1.2	4.1	0.0	0.0	5.3	22.1
Social Work	Staff	10.33	0.0	0.0	0.0	36.1	13.7	0.0	0.0	49.8	432.2
Speech Therapy	1000 Patients	2.679	0.0	0.0	0.0	9.1	12.0	3.6	0.2	25.0	70.3

Appendix 2. OGH Annual Waste Generation per Activity (Contd.)

Sections	Activity Descriptor	Activity Level	Paper								Total Paper
			Potentially Non-Recyclable								
			Diapers	Incont-inents	Under pads	Non Recyclable	Wet Paper and Gauze	Medical Sterile Pack.	Hair nets Boots etc	Total	
Laboratories											
Biochemistry	1000 Samples	920	0.0	0.0	0.0	0.0	0.6	0.0	0.0	0.6	4.6
Blood bank	1000 Samples	157	0.0	0.0	0.1	0.0	0.3	0.0	0.1	0.6	1.5
Hematology	1000 Samples	342	0.0	0.0	0.9	5.7	3.9	0.3	0.0	10.7	17.6
Microbiology/Infection Control	1000 Samples	52	0.0	0.0	0.0	10.2	3.6	2.0	0.0	15.7	113.5
Oncology (Cancer Lab)	Staff	11.5	0.0	0.0	0.0	28.6	9.0	0.0	0.0	37.6	75.9
Pathology	1000 Oper.	13	0.0	0.0	0.0	1.7	111.7	0.0	0.0	113.4	237.1
Morgue	Autopsies	250	0.0	0.0	0.0	0.0	0.7	0.3	0.0	1.0	2.3
Research Lab	Staff	14.5	0.0	0.0	1.9	21.3	15.1	0.0	0.0	38.4	44.6
Stat Lab	Staff	3	0.0	0.0	19.3	251.7	108.7	0.0	0.0	379.7	1254.6
Administration											
Admissions	1000 Patients	22	0.0	0.0	0.0	57.0	8.7	0.0	0.0	65.7	511.7
Finance, Admin, Other Offices	Staff	39	0.0	0.0	0.0	3.2	74.9	0.0	0.2	78.2	130.0
Health Services	Staff	3.5	0.0	0.0	0.0	4.3	12.1	3.2	0.0	19.6	57.7
Human Resources, Other Offices	Staff	36.7	0.0	0.0	0.0	0.2	5.0	0.0	0.0	5.2	8.5
Locker Rooms	Staff	3421	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.3
MIS	Staff	57.34	0.0	0.0	0.0	3.4	1.1	0.0	0.0	4.5	78.4
Medical Records	Staff	52	0.0	0.0	0.0	2.5	0.9	0.0	0.0	3.4	83.8
Library	Staff	1	0.0	0.0	0.0	41.2	23.1	0.0	0.0	64.3	179.0
Physicians Office	Staff	80	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.3
Physicians Office, Waiting Rm	Staff	80	0.0	0.0	0.0	20.5	13.2	0.0	0.1	33.9	67.2
Purchasing	Staff	13	0.0	0.0	0.0	41.3	4.8	0.0	0.0	46.1	171.0
Residents Lodging	Beds	17	0.0	0.0	0.0	32.4	35.1	0.0	2.1	69.6	139.3

Appendix 2. OGH Annual Waste Generation per Activity (Contd.)

Sections	Activity Descriptor	Activity Level	Paper: Potentially Non-Recyclable: Diapers	Incont-inents	Under pads	Non Recyclable	Wet Paper and Gauze	Medical Sterile Pack.	Hair nets Boots etc	Total	Total Paper
Support Services											
Coffee Shop	Staff	4	0.0	0.0	0.0	289.8	521.6	0.0	0.0	811.4	10.3
Decontam	1000 meals	2076.85	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.8
Decontam (OR Waste)	1000 Oper	13	0.0	0.0	0.0	0.0	193.5	193.5	0.0	386.9	386.9
Decontam (Packaging Waste)	1000 meals	2076.85	0.0	0.0	0.0	0.3	2.5	0.0	0.0	2.7	2.7
Dietetics	1000 meals	2076.85	0.0	0.0	0.0	1.5	3.1	0.0	0.0	4.6	28.3
Drug Store (Pharmacy)	Staff	35.75	0.0	0.0	0.0	3.9	0.0	0.0	0.0	3.9	5.8
Dry Cleaning	Staff	1	0.0	0.0	0.0	10.3	0.0	0.0	0.0	10.3	10.3
Engineering	Staff	55.62	0.0	0.0	0.0	2.1	12.3	0.0	0.3	14.8	51.7
Housekeeping	Staff	120	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2
Inventory Control	Staff	6	0.0	0.0	22.5	76.5	233.6	29.7	7.5	369.7	5333.1
Receiving	Staff	4	0.0	0.0	0.0	54.5	34.1	2.0	0.0	90.6	2542.1
SPD Office	Staff	3	0.0	0.0	7.2	24.6	75.2	9.6	2.4	119.0	439.6
Store (La Boutique)	Staff	3	0.0	0.0	0.0	0.0	9.7	0.0	0.0	9.7	861.4
Telecommunication	Staff	50.73	0.0	0.0	0.0	23.3	4.0	0.0	0.0	27.3	87.0

Appendix 2. OGH Annual Waste Generation per Activity (Contd.)

Sections	Activity Descriptor	Activity Level	Plastic							
			Non-Recyclable			Recyclable				
			Medical	Gloves	Total	Packaging	Food and Container	Polystyrene	Total	Total
Patient Care										
Cancer Lodge	Beds	17.8	0.0	0.0	0.0	16.5	14.3	5.7	36.5	36.5
Gen. Med. (Gerontology/Rheum.)	Beds	40.6	24.0	15.4	39.5	24.2	3.5	4.9	32.5	72.0
Gen. Med. (Hem./Oncology)	Beds	33	106.3	22.7	129.0	33.4	6.5	4.9	44.8	173.8
Gen. Med. (Nephrology)	Beds	35	109.5	12.3	121.9	23.0	6.2	7.5	36.8	158.6
Gen. Med. (Pulmonary, Cardio)	Beds	41.3	57.8	17.2	75.0	23.8	4.7	4.8	33.2	108.3
Gynecology	Beds	33.6	24.0	9.4	33.3	14.0	6.7	1.9	22.7	56.0
Intensive Care Unit (ICU)	Beds	15.3	342.2	79.8	422.0	27.2	4.2	4.9	36.4	458.4
Neurology (Neuro ICU)	Beds	8	53.6	28.1	81.7	32.8	2.0	4.3	39.1	120.8
Neurology (Neurosurgery)	Beds	38.8	34.6	17.6	52.2	20.5	2.6	3.4	26.6	78.8
Neurology (Offices,Clinics)	Staff	6	0.0	0.0	0.0	3.6	0.0	0.0	3.6	3.6
Neurology (Vascular Neurology)	Beds	32	72.7	25.3	98.0	19.7	3.2	3.1	26.0	124.0
Nursery	Beds	46.2	91.1	12.3	103.4	22.0	0.0	0.4	22.4	125.8
Obstetrics	Beds	49.5	31.2	4.2	35.4	20.4	11.7	3.6	35.7	71.2
Ophthamology/Urology	Beds	26.9	80.9	14.5	95.4	21.3	8.0	5.2	34.5	129.9
Orthopedics	Beds	39.8	56.5	15.8	72.2	15.4	4.6	2.5	22.5	94.8
Patient Check Out	Beds	52.3	63.5	5.6	69.1	5.5	4.0	1.5	11.0	80.2
Psychiatry (Beds)	Beds	46.3	3.5	5.7	9.2	12.1	1.4	7.2	20.8	30.0
Psychiatry (Offices)	Offices	43	0.0	0.1	0.1	1.3	2.0	1.3	4.6	4.7
Short Stay Unit	Beds	11.7	6.0	1.0	7.0	3.4	2.4	0.7	6.5	13.4
Surgery (General,Thoracic)	Beds	33.3	90.8	15.7	106.4	10.7	4.7	5.1	20.5	126.9
Surgery (Plastic/General)	Beds	32.5	98.2	18.7	116.9	20.0	4.8	5.1	29.9	146.8

Appendix 2. OGH Annual Waste Generation per Activity (Contd.)

Sections	Activity Descriptor	Activity Level	Plastic							
			Non-Recyclable			Recyclable				
			Medical	Gloves	Total	Packaging	Food and Container	Polystyrene	Total	Total
Patient Services Diagnostic										
Cardiopulmonary	1000 Proc.	62.4	7.0	0.1	7.1	2.7	0.4	0.5	3.7	10.8
Gastrointestinal Unit	1000 Proc.	2.958	603.2	79.2	682.4	59.0	0.9	3.1	63.1	745.5
Neurophysiology	1000 Patients	7.15	6.7	1.8	8.6	17.2	2.1	2.8	22.2	30.8
Nuclear Medicine	1000 Patients	6	5.8	10.4	16.1	3.4	0.5	0.7	4.6	20.8
Obstetrics/Ultrasound	1000 Patients	12	24.9	25.5	50.5	31.3	0.0	1.5	32.8	83.3
Ophthamology	1000 Patients	19.911	3.3	4.8	8.1	3.3	0.3	0.5	4.1	12.1
Radiology	1000 Exams	130.485	18.0	2.9	20.9	8.3	0.8	1.5	10.6	31.5
Patient Services Service										
Biomedical Engineering	1000 Repairs	15.36	0.0	0.0	0.0	1.1	0.2	0.0	1.4	1.4
Cancer Clinic	1000 Patients	46.8	14.6	6.1	20.7	15.0	1.7	5.7	22.3	43.0
Dialysis	1000 Patients	10.92	955.7	88.7	1044.5	32.2	11.3	18.3	61.8	1106.3
Emergency	1000 Patients	53.691	113.8	35.5	149.3	23.9	4.0	4.7	32.5	181.8
Fertility Clinic	1000 Patients	7.28	0.2	4.2	4.5	12.8	7.9	3.8	24.5	29.0
Labour and Delivery	1000 Deliveries	3.509	647.7	243.7	891.3	151.4	52.5	23.6	227.6	1118.9
Pharmacy	1000 Doses	2190	1.4	0.1	1.4	0.1	0.0	0.0	0.1	1.5
Recovery, Anaesthesia	1000 Operations	13	170.3	18.9	189.3	45.9	0.2	1.3	47.4	236.7
Surgery	1000 Operations	13	435.7	60.1	495.8	0.0	0.0	0.1	0.1	495.9
Patient Services Therapeutic										
Audiology	1000 Proc.	8.735	3.9	3.0	6.8	3.9	0.1	0.6	4.6	11.4
Occup. and Physio. Therapy	1000 Patients	25.151	0.6	0.7	1.3	3.5	4.6	2.9	11.0	12.3
Psychology/Psychiatry Offices/Clinics	1000 Patients	10.858	6.6	13.8	20.5	27.2	12.0	6.9	46.0	66.5
Respiratory Therapy (Office)	Staff	35	0.9	0.0	0.9	1.5	0.3	0.5	2.4	3.2
Social Work	Staff	10.33	0.0	0.0	0.0	0.0	21.3	12.7	34.0	34.0
Speech Therapy	1000 Patients	2.679	0.5	0.9	1.4	2.9	0.7	0.8	4.5	5.8

Appendix 2. OGH Annual Waste Generation per Activity (Contd.)

Sections	Activity Descriptor	Activity Level	Plastic							
			Non-Recyclable			Recyclable				
			Medical	Gloves	Total	Packaging	Food and Container	Polystyrene	Total	Total
Laboratories										
Biochemistry	1000 Samples	920	2.7	0.0	2.7	0.7	0.0	0.1	0.7	3.4
Blood bank	1000 Samples	157	2.1	0.0	2.1	0.1	0.0	0.0	0.1	2.2
Hematology	1000 Samples	342	0.8	1.7	2.6	1.6	0.0	0.0	1.6	4.2
Microbiology/Infection Control	1000 Samples	52	28.4	2.8	31.1	6.0	0.6	0.1	6.6	37.8
Oncology (Cancer Lab)	Staff	11.5	48.5	0.7	49.1	4.2	3.4	1.3	8.9	58.0
Pathology	1000 Oper.	13	13.1	0.0	13.1	21.0	1.0	1.7	23.7	36.8
Morgue	Autopsies	250	0.7	0.5	1.2	1.1	0.0	0.0	1.1	2.4
Research Lab	Staff	14.5	2.4	3.9	6.3	4.4	0.3	0.4	5.1	11.4
Stat Lab	Staff	3	0.0	45.4	45.4	73.1	0.4	2.9	76.3	121.7
Administration										
Admissions	1000 Patients	22	7.1	0.0	7.1	0.0	0.0	3.9	3.9	11.0
Finance, Admin, Other Offices	Staff	39	0.0	0.0	0.0	0.0	2.3	0.7	2.9	2.9
Health Services	Staff	3.5	0.0	0.0	0.0	12.9	0.1	0.2	13.2	13.2
Human Resources, Other Offices	Staff	36.7	0.0	0.0	0.0	0.0	0.2	0.0	0.2	0.2
Locker Rooms	Staff	3421	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
MIS	Staff	57.34	0.0	0.0	0.0	0.3	0.3	2.4	3.1	3.1
Medical Records	Staff	52	0.0	0.1	0.1	0.4	0.1	0.0	0.5	0.6
Library	Staff	1	0.0	0.0	0.0	7.3	3.6	5.2	16.1	16.1
Physicians Office	Staff	80	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.1
Physicians Office, Waiting Rm	Staff	80	0.0	0.1	0.1	2.3	0.9	1.0	4.2	4.3
Purchasing	Staff	13	0.0	0.0	0.0	5.5	2.3	1.8	9.6	9.6
Residents Lodging	Beds	17	0.0	0.0	0.0	13.2	11.4	4.6	29.2	29.2

Appendix 2. OGH Annual Waste Generation per Activity (Contd.)

Sections	Activity Descriptor	Activity Level	Plastic							
			Non-Recyclable			Recyclable				
			Medical	Gloves	Total	Packaging	Food and Container	Polystyrene	Total	Total
Support Services										
Coffee Shop	Staff	4	0.0	0.0	0.0	133.2	276.2	182.4	591.8	591.8
Decontam	1000 meals	2076.85	0.1	0.0	0.1	0.4	4.9	0.0	5.4	5.5
Decontam (OR Waste)	1000 Oper	13	193.5	0.0	193.5	0.0	0.0	0.0	0.0	193.5
Decontam (Packaging Waste)	1000 meals	2076.85	0.0	0.0	0.0	0.0	0.5	1.1	1.6	1.6
Dietetics	1000 meals	2076.85	0.2	0.1	0.3	1.3	2.4	0.9	4.7	5.0
Drug Store (Pharmacy)	Staff	35.75	0.6	0.0	0.6	0.1	0.1	0.1	0.2	0.9
Dry Cleaning	Staff	1	0.0	0.0	0.0	13.5	0.7	0.2	14.4	14.4
Engineering	Staff	55.62	0.0	1.2	1.2	0.7	1.3	0.5	2.5	3.7
Housekeeping	Staff	120	0.0	0.0	0.0	0.0	0.8	0.0	0.8	0.8
Inventory Control	Staff	6	85.3	2.5	87.7	232.1	13.3	21.4	266.7	354.5
Receiving	Staff	4	0.0	0.0	0.0	180.1	0.4	92.2	272.7	272.7
SPD Office	Staff	3	27.4	0.8	28.2	74.7	4.3	6.8	85.7	113.9
Store (La Boutique)	Staff	3	0.0	0.0	0.0	41.1	0.0	0.0	41.1	41.1
Telecommunication	Staff	50.73	0.0	0.0	0.0	0.9	3.5	0.0	4.3	4.3

Appendix 2. OGH Annual Waste Generation per Activity (Contd.)

Sections	Activity Descriptor	Activity Level	Glass								Metal		
			Recyclable			Non-Recyclable			Total Glass				
			Clear Container	Amber Container	Total	Clear BoroS.	Amber BoroS.	Total		Medical	Food	Total
Patient Care												
Cancer Lodge	Beds	17.8	0.0	0.0	0.0	1.0	0.0	1.0	1.0	0.0	7.4	7.4
Gen. Med. (Gerontology/Rheum.)	Beds	40.6	0.0	0.0	0.0	0.2	1.4	1.6	1.6	0.3	4.1	4.5
Gen. Med. (Hem./Oncology)	Beds	33	12.7	0.0	12.7	1.8	0.9	2.8	15.5	1.9	7.8	9.8
Gen. Med. (Nephrology)	Beds	35	4.3	0.0	4.3	0.5	0.0	0.5	4.8	1.2	7.7	9.0
Gen. Med. (Pulmonary, Cardio)	Beds	41.3	4.2	0.0	4.2	0.7	0.5	1.2	5.4	4.4	12.3	16.8
Gynecology	Beds	33.6	0.3	0.0	0.3	0.0	0.4	0.4	0.6	0.2	4.4	4.6
Intensive Care Unit (ICU)	Beds	15.3	7.2	0.0	7.2	0.0	0.0	0.0	7.2	3.2	8.9	12.1
Neurology (Neuro ICU)	Beds	8	0.0	0.0	0.0	1.9	3.0	4.9	4.9	0.3	2.0	2.3
Neurology (Neurosurgery)	Beds	38.8	0.0	0.0	0.0	2.0	2.1	4.1	4.1	0.1	4.5	4.6
Neurology (Offices,Clinics)	Staff	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Neurology (Vascular Neurology)	Beds	32	4.1	0.0	4.1	0.5	0.7	1.2	5.4	1.2	6.1	7.4
Nursery	Beds	46.2	238.2	0.0	238.2	4.8	0.0	4.8	243.0	0.6	0.5	1.1
Obstetrics	Beds	49.5	15.9	0.0	15.9	0.6	0.0	0.6	16.4	0.6	0.4	1.0
Ophthamology/Urology	Beds	26.9	3.9	0.0	3.9	0.0	0.0	0.0	3.9	2.3	1.2	3.5
Orthopedics	Beds	39.8	0.0	0.0	0.0	0.1	3.1	3.2	3.2	3.2	1.6	4.8
Patient Check Out	Beds	52.3	0.0	3.6	3.6	0.0	0.0	0.0	3.6	1.6	7.8	9.4
Psychiatry (Beds)	Beds	46.3	0.0	0.0	0.0	0.2	1.1	1.4	1.4	0.0	7.2	7.2
Psychiatry (Offices)	Offices	43	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	1.6
Short Stay Unit	Beds	11.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.5	1.6
Surgery (General,Thoracic)	Beds	33.3	0.0	0.0	0.0	0.1	0.0	0.1	0.1	1.3	15.9	17.2
Surgery (Plastic/General)	Beds	32.5	14.8	0.0	14.8	0.5	2.8	3.3	18.1	4.5	18.9	23.4

Appendix 2. OGH Annual Waste Generation per Activity (Contd.)

Sections	Activity Descriptor	Activity Level	Glass						Total Glass	Metal		
			Recyclable			Non-Recyclable						
			Clear Container	Amber Container	Total	Clear BoroS.	Amber BoroS.	Total		Medical	Food	Total
Patient Services Diagnostic												
Cardiopulmonary	1000 Proc.	62.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.9
Gastrointestinal Unit	1000 Proc.	2.958	0.0	0.0	0.0	21.4	0.0	21.4	21.4	2.5	1.5	3.9
Neurophysiology	1000 Patients	7.15	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	2.5
Nuclear Medicine	1000 Patients	6	17.2	0.0	17.2	1.8	2.0	3.8	21.0	0.0	1.2	1.2
Obstetrics/Ultrasound	1000 Patients	12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.4
Ophthamology	1000 Patients	19.911	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Radiology	1000 Exams	130.485	2.4	0.0	2.4	2.7	0.0	2.7	5.1	0.1	2.7	2.8
Patient Services Service												
Biomedical Engineering	1000 Repairs	15.36	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cancer Clinic	1000 Patients	46.8	1.1	0.3	1.4	0.2	0.0	0.2	1.5	2.0	1.5	3.5
Dialysis	1000 Patients	10.92	6.5	0.0	6.5	0.0	0.0	0.0	6.5	16.9	13.6	30.5
Emergency	1000 Patients	53.691	5.8	0.0	5.8	0.0	0.0	0.0	5.9	2.3	19.8	22.1
Fertility Clinic	1000 Patients	7.28	6.7	0.0	6.7	0.0	0.0	0.0	6.7	0.0	12.4	12.4
Labour and Delivery	1000 Deliveries	3.509	45.2	0.0	45.2	1.6	0.0	1.6	46.8	1.5	39.5	41.0
Pharmacy	1000 Doses	2190	0.0	0.0	0.0	0.5	0.1	0.6	0.6	0.0	0.0	0.0
Recovery, Anaesthesia	1000 Operations	13	7.1	0.0	7.1	0.0	0.0	0.0	7.1	0.0	0.8	0.8
Surgery	1000 Operations	13	0.0	0.0	0.0	0.3	0.0	0.3	0.3	4.9	0.0	4.9
Patient Services Therapeutic												
Audiology	1000 Proc.	8.735	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
Occup. and Physio. Therapy	1000 Patients	25.151	10.4	0.0	10.4	0.0	0.0	0.0	10.4	0.0	3.3	3.3
Psychology/Psychiatry Offices/Clinics	1000 Patients	10.858	30.4	0.0	30.4	1.3	0.0	1.3	31.7	0.0	18.5	18.5
Respiratory Therapy (Office)	Staff	35	0.0	0.0	0.0	0.0	0.5	0.5	0.5	0.1	0.4	0.5
Social Work	Staff	10.33	25.8	0.0	25.8	0.0	0.0	0.0	25.8	0.0	7.5	7.5
Speech Therapy	1000 Patients	2.679	23.2	0.0	23.2	0.0	0.0	0.0	23.2	0.2	1.5	1.6

Appendix 2. OGH Annual Waste Generation per Activity (Contd.)

Sections	Activity Descriptor	Activity Level	Glass							Metal		
			Recyclable			Non-Recyclable			Total Glass			
			Clear Container	Amber Container	Total	Clear BoroS.	Amber BoroS.	Total		Medical	Food	Total
Laboratories												
Biochemistry	1000 Samples	920	0.5	0.0	0.5	0.4	0.0	0.4	0.8	0.0	0.0	0.0
Blood bank	1000 Samples	157	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Hematology	1000 Samples	342	0.0	0.0	0.0	0.9	0.3	1.1	1.1	0.0	0.0	0.0
Microbiology/Infection Control	1000 Samples	52	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.0	0.0
Oncology (Cancer Lab)	Staff	11.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	2.4	5.1
Pathology	1000 Oper.	13	11.1	0.0	11.1	0.0	0.0	0.0	11.1	11.3	0.0	11.3
Morgue	Autopsies	250	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Research Lab	Staff	14.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4
Stat Lab	Staff	3	[illegible]	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.6	6.6
Administration												
Admissions	1000 Patients	22	10.9	0.0	10.9	0.0	0.0	0.0	10.9	0.0	7.7	7.7
Finance, Admin, Other Offices	Staff	39	0.9	0.0	0.9	0.0	0.0	0.0	0.9	1.0	0.6	1.6
Health Services	Staff	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Human Resources, Other Offices	Staff	36.7	0.1	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.1
Locker Rooms	Staff	3421	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
MIS	Staff	57.34	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.5
Medical Records	Staff	52	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.3
Library	Staff	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Physicians Office	Staff	80	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Physicians Office, Waiting Rm	Staff	80	1.7	0.0	1.7	0.0	0.0	0.0	1.7	0.0	1.6	1.6
Purchasing	Staff	13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4	1.4
Residents Lodging	Beds	17	0.0	0.0	0.0	0.8	0.0	0.8	0.8	0.0	5.9	5.9

Appendix 2. OGH Annual Waste Generation per Activity (Contd.)

Sections	Activity Descriptor	Activity Level	Glass						Total Glass	Metal		
			Recyclable			Non-Recyclable						
			Clear Container	Amber Container	Total	Clear BoroS.	Amber BoroS.	Total		Medical	Food	Total
Support Services												
Coffee Shop	Staff	4	385.6	0.0	385.6	0.0	0.0	0.0	385.6	0.0	77.1	77.1
Decontam	1000 meals	2076.85	0.5	0.0	0.5	0.0	0.0	0.0	0.5	0.0	0.0	0.0
Decontam (OR Waste)	1000 Oper	13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Decontam (Packaging Waste)	1000 meals	2076.85	0.5	0.0	0.5	0.0	0.0	0.0	0.5	0.0	0.5	0.5
Dietetics	1000 meals	2076.85	3.3	0.0	3.3	0.0	0.0	0.0	3.3	0.0	8.5	8.5
Drug Store (Pharmacy)	Staff	35.75	0.0	0.0	0.0	0.0	3.8	3.8	3.8	0.0	0.0	0.0
Dry Cleaning	Staff	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.5	1.5
Engineering	Staff	55.62	0.0	17.2	17.2	0.0	0.0	0.0	17.2	4.1	2.2	6.2
Housekeeping	Staff	120	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Inventory Control	Staff	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	61.0	64.1
Receiving	Staff	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	31.2	8.7	39.9
SPD Office	Staff	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.6	19.6
Store (La Boutique)	Staff	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.4	18.4
Telecommunication	Staff	50.73	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.9

Appendix 2. OGH Annual Waste Generation per Activity (Contd.)

Sections	Activity Descriptor	Activity Level	Food	Liquids					Misc.	Total Recyclable	Total Non-Recyclable	Total General Waste
				Medical	Blood	Urine	Food	Total				
Patient Care												
Cancer Lodge	Beds	17.8	49.3	0.0	0.0	0.0	0.0	0.0	4.3	144.9	92.2	237.1
Gen. Med. (Gerontology/Rheum.)	Beds	40.6	23.6	3.1	0.0	0.0	1.2	4.3	4.9	113.0	543.9	656.9
Gen. Med. (Hem./Oncology)	Beds	33	23.1	7.2	0.5	0.0	2.6	10.3	35.3	175.4	442.6	617.9
Gen. Med. (Nephrology)	Beds	35	32.7	8.9	0.0	0.0	14.9	23.7	11.6	160.7	375.0	535.6
Gen. Med. (Pulmonary, Cardio)	Beds	41.3	22.2	0.7	0.0	0.0	1.8	2.6	4.5	137.2	481.1	618.2
Gynecology	Beds	33.6	7.9	3.5	5.6	0.0	2.2	11.2	0.9	45.9	258.2	304.1
Intensive Care Unit (ICU)	Beds	15.3	10.9	14.0	3.1	0.0	0.0	17.1	18.1	222.9	902.8	1125.7
Neurology (Neuro ICU)	Beds	8	8.4	1.2	0.0	0.0	0.0	1.2	2.0	77.2	520.4	597.6
Neurology (Neurosurgery)	Beds	38.8	5.9	0.9	0.0	0.0	0.0	0.9	1.4	61.9	291.3	353.2
Neurology (Offices,Clinics)	Staff	6	2.0	0.0	0.0	0.0	0.0	0.0	0.0	176.0	472.4	648.4
Neur[illegible]gy (Vascular Neurology)	Beds	32	11.1	2.1	0.3	0.0	14.6	17.0	10.1	108.4	476.8	585.2
Nursery	Beds	46.2	0.0	0.0	2.0	0.0	0.0	2.0	4.6	484.6	806.0	1290.6
Obstetrics	Beds	49.5	19.6	3.6	0.0	0.0	8.0	11.6	3.5	117.4	212.9	330.3
Ophthamology/Urology	Beds	26.9	34.1	4.8	0.0	0.4	0.6	5.8	7.3	156.4	257.7	414.1
Orthopedics	Beds	39.8	8.5	1.3	2.6	0.0	1.6	5.6	3.9	67.6	291.2	358.8
Patient Check Out	Beds	52.3	64.8	106.1	0.0	0.0	0.0	106.1	15.6	99.5	295.4	394.9
Psychiatry (Beds)	Beds	46.3	15.4	0.8	0.0	0.0	2.7	3.4	2.7	56.8	136.8	193.6
Psychiatry (Offices)	Offices	43	10.3	0.0	0.0	0.0	0.0	0.0	0.4	45.2	30.5	75.7
Short Stay Unit	Beds	11.7	4.0	2.3	0.0	0.0	0.0	2.3	0.0	34.3	25.7	60.0
Surgery (General,Thoracic)	Beds	33.3	15.0	2.4	0.0	0.0	0.0	2.4	10.0	207.8	337.6	545.5
Surgery (Plastic/General)	Beds	32.5	24.9	1.6	0.4	0.0	6.2	8.2	7.3	190.6	378.6	569.1

Appendix 2. OGH Annual Waste Generation per Activity (Contd.)

Sections	Activity Descriptor	Activity Level	Food	Liquids					Misc.	Total Recyclable	Total Non-Recyclable	Total General Waste
				Medical	Blood	Urine	Food	Total				
Patient Services Diagnostic												
Cardiopulmonary	1000 Proc.	62.4	1.5	0.5	0.0	0.6	0.4	1.5	1.7	33.6	17.5	51.1
Gastrointestinal Unit	1000 Proc.	2.958	57.1	70.0	0.8	0.0	0.0	70.8	0.0	205.4	1171.5	1376.9
Neurophysiology	1000 Patients	7.15	25.9	0.4	0.0	0.0	0.2	0.6	9.8	479.3	66.2	545.5
Nuclear Medicine	1000 Patients	6	0.0	0.0	0.0	0.0	0.0	0.0	1.2	65.3	36.3	101.7
Obstetrics/Ultrasound	1000 Patients	12	2.2	0.0	0.0	0.0	0.0	0.0	2.7	87.1	223.4	310.5
Ophthamology	1000 Patients	19.911	3.1	0.3	0.0	0.0	0.0	0.3	0.0	42.8	29.3	72.1
Radiology	1000 Exams	130.485	3.9	1.8	0.1	0.0	0.0	1.9	8.2	70.0	56.2	126.2
Patient Services Service												
Biomedical Engineering	1000 Repairs	15.36	0.0	0.0	0.0	0.0	0.0	0.0	0.5	4.2	7.9	12.1
Cancer Clinic	1000 Patients	46.8	18.0	0.4	0.3	0.0	2.2	3.0	61.7	117.1	173.1	290.2
Dialysis	1000 Patients	10.92	51.8	155.0	0.0	0.0	0.0	155.0	31.7	603.7	1872.7	2476.4
Emergency	1000 Patients	53.691	10.2	45.7	0.0	0.0	0.0	45.7	23.8	156.2	533.9	690.2
Fertility Clinic	1000 Patients	7.28	17.1	0.0	0.0	0.0	0.4	0.4	0.5	108.6	70.2	178.9
Labour and Delivery	1000 Deliveries	3.509	109.0	34.9	0.0	8.2	0.0	43.1	26.6	1330.0	3125.6	4455.6
Pharmacy	1000 Doses	2190	0.0	0.3	0.0	0.0	0.0	0.3	0.0	1.7	2.7	4.3
Recovery, Anaesthesia	1000 Operations	13	0.7	25.0	1.8	0.0	0.0	26.8	5.3	145.4	312.6	457.9
Surgery	1000 Operations	13	0.0	0.8	1.0	0.0	0.0	1.8	0.9	203.6	893.0	1096.6
Patient Services Therapeutic												
Audiology	1000 Proc.	8.735	0.4	0.0	0.0	0.0	0.0	0.0	0.0	37.3	40.5	77.8
Occup. and Physio. Therapy	1000 Patients	25.151	21.1	0.0	0.0	0.0	0.0	0.0	5.0	71.1	52.8	123.9
Psychology/Psychiatry Offices/Clinics	1000 Patients	10.858	38.7	0.0	0.0	0.0	0.0	0.0	11.6	726.4	272.7	999.1
Respiratory Therapy (Office)	Staff	35	1.7	0.0	0.0	0.0	0.0	0.0	0.9	21.4	7.5	28.9
Social Work	Staff	10.33	54.5	0.0	0.0	0.0	0.0	0.0	0.0	504.2	49.8	554.0
Speech Therapy	1000 Patients	2.679	6.6	0.0	0.0	0.0	0.0	0.0	1.6	81.3	28.0	109.2

Appendix 2. OGH Annual Waste Generation per Activity (Contd.)

Sections	Activity Descriptor	Activity Level	Food	Liquids					Misc.	Total Recyclable	Total Non-Recyclable	Total General Waste
				Medical	Blood	Urine	Food	Total				
Laboratories												
Biochemistry	1000 Samples	920	0.2	0.2	0.0	0.0	0.0	0.2	0.3	5.4	4.3	9.6
Blood bank	1000 Samples	157	0.0	0.0	0.0	0.0	0.0	0.0	0.1	1.0	2.7	3.7
Hematology	1000 Samples	342	0.1	0.0	0.0	0.0	0.0	0.0	1.4	8.5	15.9	24.4
Microbiology/Infection Control	1000 Samples	52	0.0	0.0	0.0	0.0	0.0	0.0	0.2	104.5	47.2	151.6
Oncology (Cancer Lab)	Staff	11.5	3.7	0.0	0.0	0.0	1.1	1.1	3.1	56.1	90.9	147.0
Pathology	1000 Oper.	13	0.0	0.0	0.0	0.0	0.0	0.0	1.0	169.8	127.5	297.3
Morgue	Autopsies	250	0.0	0.0	0.0	0.0	0.0	0.0	0.5	2.4	2.8	5.2
Research Lab	Staff	14.5	3.2	0.0	0.0	0.0	0.0	0.0	0.0	15.0	44.7	59.7
Stat Lab	Staff	3	96.8	0.0	0.0	0.0	0.0	0.0	78.9	1054.7	504.0	1558.7
Administration												
Admissions	1000 Patients	22	14.4	0.0	0.0	0.0	0.0	0.0	2.6	482.9	75.4	558.3
Finance, Admin, Other Offices	Staff	39	3.3	0.0	0.0	0.0	0.0	0.0	0.8	60.5	79.0	139.5
Health Services	Staff	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.6	51.3	20.2	71.5
Human Resources, Other Offices	Staff	36.7	0.2	0.0	0.0	0.0	0.0	0.0	0.1	3.9	5.3	9.2
Locker Rooms	Staff	3421	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.3	0.6
MIS	Staff	57.34	1.6	0.0	0.0	0.0	0.0	0.0	1.4	79.1	5.9	85.0
Medical Records	Staff	52	0.8	0.0	0.0	0.0	0.0	0.0	0.0	82.0	3.5	85.5
Library	Staff	1	16.8	0.0	0.0	0.0	0.0	0.0	5.5	147.7	69.9	217.5
Physicians Office	Staff	80	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.2	0.8
Physicians Office, Waiting Rm	Staff	80	6.9	0.0	0.0	0.0	0.1	0.1	1.1	47.7	35.3	82.9
Purchasing	Staff	13	9.8	0.0	0.0	0.0	2.7	2.7	11.2	145.8	60.0	205.8
Residents Lodging	Beds	17	39.5	0.0	0.0	0.0	0.0	0.0	3.5	144.2	73.9	218.1

Appendix 2. OGH Annual Waste Generation per Activity (Contd.)

Sections	Activity Descriptor	Activity Level	Food	Liquids					Misc.	Total Recyclable	Total Non-Recyclable	Total General Waste
				Medical	Blood	Urine	Food	Total				
Support Services												
Coffee Shop	Staff	4	1811.6	0.0	0.0	0.0	0.0	0.0	98.9	3064.9	910.3	3975.2
Decontam	1000 meals	2076.85	56.4	0.0	0.0	0.0	20.4	20.4	0.4	64.2	21.0	85.1
Decontam (OR Waste)	1000 Oper	13	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	580.4	580.4
Decontam (Packaging Waste)	1000 meals	2076.85	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.7	2.7	5.4
Dietetics	1000 meals	2076.85	25.0	0.0	0.0	0.0	0.2	0.2	0.7	65.2	5.8	71.0
Drug Store (Pharmacy)	Staff	35.75	0.1	0.0	0.0	0.0	0.0	0.0	0.9	2.3	9.2	11.5
Dry Cleaning	Staff	1	0.0	0.0	0.0	0.0	1.5	1.5	19.1	16.0	30.9	46.9
Engineering	Staff	55.62	4.7	0.0	0.0	0.0	0.0	0.0	5.1	67.5	21.0	88.6
Housekeeping	Staff	120	0.0	0.0	0.0	0.0	0.0	0.0	2.0	3.0	2.0	5.0
Inventory Control	Staff	6	129.6	0.0	0.0	0.0	0.0	0.0	45.2	5423.8	502.6	5926.4
Receiving	Staff	4	2.1	0.0	0.0	0.0	0.0	0.0	16.9	2766.2	107.4	2873.6
SPD Office	Staff	3	40.3	0.0	0.0	0.0	0.0	0.0	12.4	466.3	159.6	625.9
Store (La Boutique)	Staff	3	3.1	0.0	0.0	0.0	0.0	0.0	0.0	914.3	9.7	924.0
Telecommunication	Staff	50.73	0	0.0	0.0	0.0	0.0	0.0	0.9	65.8	28.2	93.9

Appendix 2. OGH Annual Biomedical Waste Generation per Activity (kg/yr/Activity Descriptor)

Sections	Activity Descriptor	Activity Level	Sharps Container Wastes	Other Non-Anatomical Infectious Wastes*	Sub Total	Anatomical Wastes	Cytotoxic Wastes	Sub Total	Total Biomedical Wastes
Patient Care									
Cancer Lodge	Beds	17.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gen. Med. (Gerontology/Rheum.)	Beds	40.6	15.1	0.0	15.1	3.5	0.0	3.5	18.6
Gen. Med. (Hem./Oncology)	Beds	33	29.7	11.0	40.7	0.0	7.9	7.9	48.6
Gen. Med. (Nephrology)	Beds	35	46.5	3.7	50.3	0.0	0.0	0.0	50.3
Gen. Med. (Pulmonary, Cardio)	Beds	41.3	12.4	24.6	37.0	6.8	0.0	6.8	43.9
Gynecology	Beds	33.6	6.4	2.0	8.4	0.0	0.0	0.0	8.4
Intensive Care Unit (ICU)	Beds	15.3	136.0	0.0	136.0	0.0	0.0	0.0	136.0
Neurology (Neuro ICU)	Beds	8	58.8	0.0	58.8	19.9	0.0	19.9	78.7
Neurology (Neurosurgery)	Beds	38.8	4.6	33.3	38.0	0.0	0.0	0.0	38.0
Neurology (Offices,Clinics)	Staff	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Neurology (Vascular Neurology)	Beds	32	22.7	0.0	22.7	0.0	0.0	0.0	22.7
Nursery	Beds	46.2	17.5	0.0	17.5	0.0	0.0	0.0	17.5
Obstetrics	Beds	49.5	8.7	0.0	8.7	0.0	0.0	0.0	8.7
Ophthamology/Urology	Beds	26.9	21.4	1.5	22.9	0.0	1.5	1.5	24.4
Orthopedics	Beds	39.8	7.8	0.0	7.8	0.0	0.0	0.0	7.8
Patient Check Out	Beds	52.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Psychiatry (Beds)	Beds	46.3	1.7	0.0	1.7	0.0	0.0	0.0	1.7
Psychiatry (Offices)	Offices	43	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Short Stay Unit	Beds	11.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Surgery (General,Thoracic)	Beds	33.3	32.6	0.0	32.6	0.0	0.0	0.0	32.6
Surgery (Plastic/General)	Beds	32.5	37.2	0.0	37.2	0.0	0.0	0.0	37.2

* Other Non-Anatomical Infectious Wastes include microbiology laboratory waste and blood and body fluids

Appendix 2. OGH Annual Biomedical Waste Generation per Activity (kg/yr/Activity Descriptor)

Sections	Activity Descriptor	Activity Level	Sharps Container Wastes	Other Non-Anatomical Infectious Wastes*	Sub Total	Anatomical Wastes	Cytotoxic Wastes	Sub Total	Total Biomedical Wastes
Patient Services Diagnostic									
Cardiopulmonary	1000 Proc.	62.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gastrointestinal Unit	1000 Proc.	2.958	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Neurophysiology	1000 Patients	7.15	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nuclear Medicine	1000 Patients	6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Obstetrics/Ultrasound	1000 Patients	12	43.8	0.0	0.0	0.0	0.0	0.0	0.0
Ophthamology	1000 Patients	19.911	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Radiology	1000 Exams	130.485	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Patient Services Service									
Biomedical Engineering	1000 Repairs	15.36	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cancer Clinic	1000 Patients	46.8	0.0	45.8	45.8	0.0	0.0	0.0	45.8
Dialysis	1000 Patients	10.92	25.5	0.0	25.5	0.0	0.0	0.0	25.5
Emergency	1000 Patients	53.691	21.8	0.0	21.9	0.0	0.0	0.0	21.8
Fertility Clinic	1000 Patients	7.28	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Labour and Delivery	1000 Deliveries	3.509	85.6	0.0	85.6	387.9	0.0	387.9	473.4
Pharmacy	1000 Doses	2190	0.7	0.4	1.0	0.0	0.3	0.3	1.3
Recovery, Anaesthesia	1000 Operation	13	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Surgery	1000 Operation	13	0.0	0.0	0.0	86.7	0.0	86.7	86.7
Patient Services Therapeutic									
Audiology	1000 Proc.	8.735	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Occup. and Physio. Therapy	1000 Patients	25.151	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Psychology/Psychiatry Offices/Clinics	1000 Patients	10.858	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Respiratory Therapy (Office)	Staff	35	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Social Work	Staff	10.33	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Speech Therapy	1000 Patients	2.679	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 2. OGH Annual Biomedical Waste Generation per Activity (kg/yr/Activity Descriptor)

Sections	Activity Descriptor	Activity Level	Sharps Container Wastes	Other Non-Anatomical Infectious Wastes*	Sub Total	Anatomical Wastes	Cytotoxic Wastes	Sub Total	Total Biomedical Wastes
Laboratories									
Biochemistry	1000 Samples	920	2.4	0.0	2.4	0.0	0.0	0.0	2.4
Blood bank	1000 Samples	157	29.5	7.6	37.2	0.0	0.0	0.0	37.2
Hematology	1000 Samples	342	2.2	2.5	4.7	0.0	0.0	0.0	4.7
Microbiology/Infection Control	1000 Samples	52	96.0	128.1	224.1	0.0	0.0	0.0	224.1
Oncology (Cancer Lab)	Staff	11.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Pathology	1000 Oper.	13	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Morgue	Autopsies	250	0.0	3.3	3.3	14.3	0.0	14.3	17.7
Research Lab	Staff	14.5	0.0	82.7	82.7	0.0	0.0	0.0	82.7
Stat Lab	Staff	3	411.1	0.0	411.1	0.0	0.0	0.0	411.1
Administration									
Human Resources, Other Offices	Staff	36.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MIS	Staff	57.34	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Medical Records	Staff	52	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Library	Staff	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Physicians Office	Staff	80	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Physicians Office, Waiting Rm	Staff	80	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Purchasing	Staff	13	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Residents Lodging	Beds	17	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Admissions	1000 Patients	22	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Finance, Admin, Other Offices	Staff	39	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Locker Rooms	Staff	3421	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Health Services	Staff	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix 2. OGH Annual Biomedical Waste Generation per Activity (kg/yr/Activity Descriptor)

Sections	Activity Descriptor	Activity Level	Sharps Container Wastes	Other Non-Anatomical Infectious Wastes*	Sub Total	Anatomical Wastes	Cytotoxic Wastes	Sub Total	Total Biomedical Wastes
Support Services									
Coffee Shop	Staff	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Decontam	1000 meals	2076.85	0.8	0.0	0.8	0.0	0.0	0.0	0.8
Decontam (OR Waste)	1000 Oper	13	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Decontam (Packaging Waste)	1000 meals	2076.85	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dietetics	1000 meals	2076.85	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Drug Store (Pharmacy)	Staff	35.75	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Dry Cleaning	Staff	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Engineering	Staff	55.62	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Housekeeping	Staff	120	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Inventory Control	Staff	6	47.5	0.0	47.5	0.0	0.0	0.0	47.5
Receiving	Staff	4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SPD Office	Staff	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Store (La Boutique)	Staff	3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Telecommunication	Staff	50.73	0.0	0.0	0.0	0.0	0.0	0.0	0.0

APPENDIX 3: Selected Liquid and Chemical Wastes Generated per Section at OGH per year

APPENDIX 3 - Selected Liquid and Chemical Wastes Generated per Section at OGH per year*

*where quantities omitted, data not available or minimal

Patient Service - Diagnostic

Material	Use	Quantity/ year	Container Type	Disposal
Neurophysiology				
Solvents				
Acetone	To clean electrode	220 L	Amber glass (~ 54/yr)	Evaporate & sewer
Others				
Glue	For electrodes	60 L	Amber glass	Solid waste
Obs/Ultrasound				
Others				
Fixers	For photo development	180 L	Plastic jug	Silver recovery then
Developers	For photo development	225 L	Plastic jug	sewer
Occupational Therapy				
Solvents				
Varsol		5 L		Evaporate/sewer

APPENDIX 3 - Patient Service, Diagnostic (contd.)

Material	Use	Quantity/ year	Container Type	Disposal
Physiotherapy				
Solvents				
Isopropyl alcohol		10 L		Sewer/solid waste
Others				
Cidex	Phenol based disinfectant	95 L		Sewer/solid waste
Ultrasound Gel		95 L		Solid Waste
Parafin Oil		10 L		Solid waste
Wood Preservative & stain				

APPENDIX 3 (contd.)

Patient Service - Service

Material	Use	Quantity/ year	Container Type	Disposal
Biomedical Engineering				
Solvents				
Acetone	Used for cleaning equipment	0.2 L		Evaporated or tissue wipes to solid waste
Methanol		0.2 L		
Trichloro-ethylene		0.15 L		
Others				
Batteries (specialized)	Power medical devices	100-200		Battery supplier/recycler company in Ottawa
NiCd		(0.75 lb ea)		
Lead acid (gel)		51 kg		
Batteries (specialized)				
Silver Oxide		~ 12		Solid waste
Manganese		~ 12		
Lithium		~ 12		
Mercury		~ 12		

APPENDIX 3 - Patient Service, Service (contd.)

Material	Use	Quantity/ year	Container Type	Disposal
Mercury	Collect from spills all over hospital i.e. blood pressure machines (contain 2-300 g - avg 12-15 breaks/year)	10 kg Hg	Glass jar with water on top to prevent fumes	Mercury reclaimer Cohens
	Mercury contaminated articles	5 kg Hg contaminated waste		Mercury reclaimer, Cohens
Cancer Clinic				
Solvents				
Acetone				Evaporates
Isopropyl alcohol (40%)	For cleaning			Evaporates
Others				
Antineoplastics	Patient treatment			Residual waste incinerated Administered products to patients
Pharma-ceuticals	Patient treatment			Residual waste sewered Administered products to patient

APPENDIX 3 - Patient Service, Service (contd.)

Material	Use	Quantity/ year	Container Type	Disposal
Dialysis				
Formaldehyde	Disinfectant in haemo-dialysis units which are cleaned 1 x day Largely discontinued now except for 1 haemo patient	3-4% HCOOH		Sewer
Amuchina (an electrolyte chloroxidizer: hypochlorite active ingredient - non toxic)	Disinfectant in haemo dialysis machines which are cleaned 1 x per day machine/	450-600 ppm of free Cl^- (~30%) - 195 mL/ day 1150 L	Plastic (4 L) jug 287 jugs/yr	Sewer
Sodium bicarbonate	Makeup for dialysis solution	(10 L/ patient) 146,000 L	Need individual containers due to high potential for contamination Plastic 10 L jug 14,600/yr (30-40/day)	Sewer

APPENDIX 3 - Patient Service, Service (contd.)

Material	Use	Quantity/ year	Container Type	Disposal
Acidified sodium bicarbonate	Makeup for dialysis solution	54,000 L	Fiber drums, 45 gal plastic lined metal ends (21-22 drum/month) 264 drums/year	Sewer
Glacial acetic acid	Removes precipitate i.e. calcium from lines		Glass bottles	Sewer
Oxalic acid	Removes iron deposits used as rinse	(1 lb/3 months)	Glass or plastic 4/year	Sewer
Miscellaneous	Water purification by Engineering Dept.			
Pharmacy				
Medication	Patient treatment	6,000 doses/day	Various	Internally to patient
Unwanted pharma-ceuticals	No longer required	~ 40 diff. chemicals all <500 g 1x event ≈ 20 kg	Various	Sent to private pharmacy for reuse

APPENDIX 3 - Patient Service, Service (contd.)

Material	Use	Quantity/ year	Container Type	Disposal
Narcotic drugs	Patient treatment (need special authorization for disposal)	Very small	Various	Sewer with witnesses
Opened unit dose medication	Patient no longer requires	unavailable	Various	Sewer with witnesses
Out of date unit dose		unavailable	Various	Sewer with witness Some returned to manufacturer for credit Some sewered with credit manufacture
Antiviral drugs (biohazard)	Patient treatment		Various/glass Mixed into IV bag for treatment	Containers into biohazard bags

APPENDIX 3 - Patient Service, Service (contd.)

Material	Use	Quantity/ year	Container Type	Disposal
Recovery/Anaesthesia				
Anaesthetic gas (i.e. isofluorane)	Patient anaesthetic	70,000 mL (99.8% wasted, ie. not patient absorbed)	Borosilical glass container ~ 20/day	As containers - infectious waste and solid waste As gas - atmosphere
Surgery				
Formaldehyde	Tissue sample preservation	As supplied by pathology		Sewer

APPENDIX 3 (contd.)

Laboratories

Material	Use	Quantity/ year	Container Type	Disposal
Biochemistry				
Solvents				
Ethanol				Sewer
Methanol				Sewer
Phenol				Sewer
Endocrinology				
Ethyl ether		4 L		Evaporated
Methanol		15.6 L		Sewer/evaporated
Toluene		12 L		Sewer/evaporated
Toluene (liquid scintillation counting) (will replace with non solvent base soon)		20 L	Amber Bottle	Incineration with pathological waste
Urine Analysis				
Solvents		Low usage		Sewer

APPENDIX 3 - Laboratories (contd.)

Material	Use	Quantity/ year	Container Type	Disposal
Blood Bank				
Solvents				
Chloroquinone		~0.1 L		Sewer
Haematology				
Solvents				
Acetone		12 L		Sewer
Acetone (60%)		5.2 L		Sewer
Methanol	Destaining	520 L		Sewer
Toluene				
Phenol				
Gluton-aldehyde				
Formaldehyde				
Others				
2% potassium ferricyanide		7.8 L		Sewer
1% blood/ isotonic solution				Sewer

APPENDIX 3 - Laboratories (contd.)

Material	Use	Quantity/ year	Container Type	Disposal
Microbiology				
Solvents				
Alpha naphthol	Reagent for micro dilution plate	0.4 L		Sewer
Dimethyl alphanaphthy-lamine	Reagent for micro dilution plate	0.4 L		Sewer
Giemsa stain solution		1.5 L		Sewer
Kovac's reagent	Reagent for micro dilution plate	0.4 L		
Others				
Sulfonilic acid		0.4 L		Sewer

APPENDIX 3 - Laboratories (contd.)

Material	Use	Quantity/ year	Container Type	Disposal
Pathology				
Autopsy				
Solvents				
Ethanol 10% formalin	Sample preservation	(~ 100 L/ week) = 5200 L	Plastic/OCC container	Sewer
Jores solution (600 mL formalin/ 20 L with NaCl, Ala bicarb)				
20% formalin	Preservation of brain tissue	1,920 L	Plastic/OCC containers	Stored on site then sewered
Others				
Comsept plus	General cleaning solution phenol based			Sewer/solid waste
Mineral Oil				

APPENDIX 3 - Laboratories (contd.)

Material	Use	Quantity/ year	Container Type	Disposal
Cytology				
Solvents				
Ethanol				
Methanol				
Toluenes				
Others				
Cidex				
Haematoxylin				
Electron Microscopy				
Solvents				
Acetone Ethanol Chloroform Glutaner aldehyde Methanol Para formaldehyde	Primarily in the preservation of embedded tissues			Previously hardened and solid waste disposed

APPENDIX 3 - Laboratories (contd.)

Material	Use	Quantity/ year	Container Type	Disposal
Electron Microscopy				
Others				
Osmium textroxide				
Developers				
Fixers				
Lead citrate				
Histology				
Solvents				
Ethanol		est. 3120 L		Sewer
Formaldehyde		est. [illegible] L		Sewer
Toluene		est. 650 L		Hazardous waste disposal
Methanol		65 L		Sewer
Acetone				
Dichlorodi-fuoromethane				
Dimethyl-formamide				
Methylbutane-2				
Phenol				

APPENDIX 3 - Laboratories (contd.)

Material	Use	Quantity/ year	Container Type	Disposal
Histology (continued)				
Others		Minimal		
Aluminum salts				
Chromic acid				
Gold chloride				
Mercuric-chloride				
Mercuric-oxide red.				
Picric acid				
Phospho-molybdic acid				
Phospho-tungstic acid				
Silver nitrate				
Silver protein				
Uranyl acetate				
Immunopathology				
Solvents				
Ethanol				

APPENDIX 3 - Laboratories (contd.)

Material	Use	Quantity/ year	Container Type	Disposal
Neuropathology				
Solvents				
Acetone				
Aniline				
Butanol				
Chloroform				
Dimethyl formanide				
Glutar aldehyde				
Methanol				
Methyl butane-2				
Phenylene diamine				
Toluene				
Others				
Aluminum salts				
Barbitol sodium				
Chromium trioxide				
Cobalt chloride				
Copper metal				
[illegible] sulfate				
Gold chloride				

APPENDIX 3 - Laboratories (contd.)

Material	Use	Quantity/ year	Container Type	Disposal
Neuropathology (continued)				
Lead salts Magnesium salts Osmium tetroxide Pearlodic acid Phospho-molybdic acid Phospho-tungstic acid Silver nitrate Silver protein Sodium arsenate Uranyl acetate & nitrate		Minimal		
Oncology				
Acetic acid		min	Clear plastic	
Acetone		1 L		
Ammonium hydroxide		4 L		Sewered

APPENDIX 3 - Laboratories (contd.)

Material	Use	Quantity/ year	Container Type	Disposal
Oncology (continued)				
(Chromic acid)	To clean glassware Have not started yet	(48 L projected)		Not yet determined
Dimethyl sulphoxide		1 L		
Ecoscint	For scintillation counting			Sewered
Formic acid		1 L		
Hydrochloric acid		8 L		
Isopropanol		12 L		
Methanol		12 L		
Nitric acid		0.5 L		
Trichoroacetate		1.2 kg		
Organic wastes mixture phenol/ chloroform		12 L		Disposal for incineration with pathological waste
Research				
Chloroform)				)
Phenol)	DNA work	4 L		)Hazardous waste
Acrylamide	In polyacrilamide gel electropheresis	0.5-1 L		)disposal via university)
Acetone				
Acetonitrile				

APPENDIX 3 - Laboratories (contd.)

Material	Use	Quantity/ year	Container Type	Disposal
Research (continued)				
Carbon tetrachloride Cyclohexane Ethylether Ethylacetate Xylene				
Various aqueous "solvents"	Tissue Culture Wax	Minimal		Collected in container and mixed with javex Disposed to sewer
Stat Lab				
Solvents Xylene Pyridine Methylbutane-2 Formaldehyde Ethyl ether Chloroform Acetone Methanol Ethyleneglycol		Minimal		

APPENDIX 3 - Laboratories (contd.)

Material	Use	Quantity/ year	Container Type	Disposal
Stat Lab (continued)				
Other				
Nitric acid Hydrochloric acid Acetic Acid Picric acid		Minimal		Sewer Hazardous Waste

APPENDIX 3 (contd.)

Adminstration/Support Services

Material	Use	Quantity/ year	Container Type	Disposal
Dietary Services				
Frymax oils	Cooking (without filter) (with filter & reuse)	8,640 L 4,320 L		For recycle at Orenco
Soaps/Cleaners				
Ideal soap	Sink wash	1,200 K	20 L plastic	Sewer
Protect	Pot washing	300 kg	Paper drum (4-5/year)	Sewer
Kwat	For stainless steel & fridge cleaning	~ 20 L		
CGillx	Oven grill cleaning			
Ajax	General scrubber	1,152 kg	Cardboard/metal	Solid waste
Twell	Floor cleaner	2,016 L	Plastic 250 mL	Sewer

APPENDIX 3 - Admin/Support Services (contd.)

Material	Use	Quantity/ year	Container Type	Disposal
Engineering				
Electrical Halons	Fire protection systems for electrical, computer communication areas, and explosive chemical area at loading dock	795 kg (total - unused unless fire at OGH)	Metal canisters (#units 8 x 200 lb size) (#units 5 x 30 lb size)	To atmosphere upon fire Small quantities to atmosphere on testing
General Liquid descalers Flux remover				
Physical Plant Oils	Motor/lubrication, etc.	450 L		Taken home by OGH employee for vehicle undercoating

APPENDIX 3 - Admin/Support Services (contd.)

Material	Use	Quantity/ year	Container Type	Disposal
Physical Plant (continued)				
Also generate small quantities of:				
Paints, Latex				
Oil				
Turpentines				
Cleaners				
CFC13, 22				
Soldering fluxes				
Plant Operations				
Waste Treatment				
HCl	Regeneration of ion exchange	2,200 kg	Drum - returned to Stanchem supplier	Sewer
Caustic	- do -	1,260 kg	Metal drums - not returned	Sewer
Sodium hypochlorite	Used to maintain 2 ppm Cl^- in water		20 L drums sent back to manufacturer	Sewer
Ion exchange resin	Provide deionized water primarily for dialysis	1,070 L		Sewer
Dearside 545	Anticorrosion and oxygen scavenging	615 L		Sewer at 60-150 ppm

APPENDIX 3 - Admin/Support Services (contd.)

Material	Use	Quantity/ year	Container Type	Disposal
Plant Operations (continued)				
Dearside 702 Poly El	Biocide	175.5 L		Sewer
pH 9.5	Biocide	175.5 L		Sewer (75-125 ppm)
Dearborne 905	Biocide	175.5 L		Sewer
Cooling Operations				
CFC11	Chilling operations tonne units	2 x 1000		Servicing & recovery by Trane
CFC12	Used in air driers	4 x 3.5 lbs		Overhaul service 2/yr
	Provide pressunzed dry air for OR and laboratories	1 x 2.125 lbs		Complete dismantle - every 2 years
CFC22				(last overhall 85-86)

Also generate small quantities of:
- Soldering flux
- Paint remover
- Paint thinner
- Turpentine

APPENDIX 3 - Admin/Support Services (contd.)

Material	Use	Quantity/ year	Container Type	Disposal
Housekeeping				
General purpose cleaners				
Ajax	Scrubber	3,328 kg	Cardboard/metal (8320 x 0.4 kg)	Sewer. Garbage
All purpose	Wall cleaner	600 L	Plastic pail (20 L)	
Hi Tor plus	Germicide	115 L	Plastic jug (20 L) 0.5 0z/gal water	Sewer
Vinegar	Window cleaner (summer)	1,170 L	Plastic (20 L)	
Methanol	Window cleaner (winter)	160 L	Plastic (20 L) 3 oz/gal	
Javex		1,872 L	Plastic, diluted 50%	Sewer
Bleach (powder)		420 kg		
Sunlight liquid detergent	Window cleaner	320 L	Plastic jug (10 L) (diluted 1:600)	
Universal cleaner	Porcelain cleaner	522 L	Plastic (5 L)	
Detergents				
Hand soap	Hand soap	4,320 L	Plastic	Sewer
Defoamers	Defoamers	100 L		Sewer
Washing soap	Washing machine	400 kg	Paper bags	Sewer

APPENDIX 3 - Admin/Support Services (contd.)

Material	Use	Quantity/ year	Container Type	Disposal
Degreasers				
High strength	Fumehood cleaning	60 L	Steel jug (20 L)	
Lower strength	Kitchen	600 L	Plastic jug (20 L)	
Turbo	Grease trap treatment	120 L	Plastic (20 L)	
Floor/Carpet Cleaners				
Rug				
Rug spotters	Stain remover	36 L	Plastic (20 L)	
Orangatang	Multi use solvent	12 L	Plastic (5 L)	
Prespotter	Stain remover	150 L	Plastic (20 L)	
Water extraction	Carpet cleaner	620 L	Plastic (20 L)	
Wiz	carpet cleaner			
Floor				
Floor finish		1,000 L	Plastic (22.7 L)	
Floor seal		60 L		
Wax stripper		2,740 L	Plastic (20 L)	
Hygo	Oil treatment for dust mops	300 L	Plastic (20 L)	
Other				
Solvoplast	Solvent for tape removal	5 L		
	Furniture polish	40 L	Plastic	
	Deoderizers in rooms	193.5 L	Plastic (20 L)	

APPENDIX 3 - Admin/Support Services (contd.)

Material	Use	Quantity/ year	Container Type	Disposal
SPD				
Offspec solvents (i.e. ethanol)	Cannot use in hospital due to contamination	205 L (one time)	Drum	By hazardous waste disposal
Ethylene oxide/ CFC12 (88% Eto: 12% CFC12)	On-site sterilization of medical devices primarily for critical surgeries 2 x 90 lb cylinders/week Have 2 machines at OGH (volume inside = 96 ft^3) and provide contract sterilizing for a number of other hospitals (≈ 20% of loads for contract work) Number of items per load can range from 30 to 100 pieces. (Use relate to # of critical surgeries - size of hospital)	4.25 tonnes	Cylinders	Atmosphere

APPENDIX 3 - Admin/Support Services (contd.)

Material	Use	Quantity/ year	Container Type	Disposal
Liquified food waste	Results from food maceration and centrifugation possible high suspended solids and biological oxygen demand (BOD)			Sewer
Telecommunications/Printing				
Printing				
Blanket wash		270 L		Soaked into solvented rags - solid waste
Cleaning solvent		270 L		
Colour wash		270 L		
Developer		540 L		
Fixer		270 L		Housekeeping take to silver recovery
Fountain concentrate		12 L		

APPENDIX 4: Suggested Waste Sorting Procedure

Suggested Safety Guidelines for Sorting Hospital Waste

In dealing with hospital waste, even though it is considered clean genral waste, there is always a chance that something might be in there that should not be. The greatest potential danger arises from unseen sharps in the waste. Contact the Infection Control Director to go through a waste sorting procedure to assure yourself and the audit team that the procedure is safe. Specific concerns include:

(1) Wear outer clothing which can be removed should anything spill on you.

(2) Wear heavy duty gloves at all times.

(3) Do not touch your face (i.e. eyes, mouth especially) while in the sorting area.

(4) Absolutely no food, drinks or smoking in the sorting area.

(5) Open waste bags carefully and use long stemmed tongs or pushing sticks to separate wastes into different material components as described in Section 7.5.

(6) Move waste around carefully as not to induce the creation of aerosols.

(7) Use tarps on sorting labels and wipe all areas and items with Javex at the end of a working period.

(8) Do not leave any open garbage lying around when nobody is in the room.

(9) Immediately after leaving the sorting area, proceed to a washup area.

APPENDIX 5: Help Section: Waste Management Contacts

- **Provincial and Territorial Regulators**
- **Waste Exchanges**
- **Provincial Recycling Organizations**
- **Specific Municipal Contacts in Ontario**
- **Specific Commercial Recycling Contacts**

AUTHORITIES RESPONSIBLE FOR WASTE MANAGEMENT AND BIOMEDICAL WASTE IN EACH PROVINCE AND TERRITORY

They can provide information on regulations, Ministry policies and programs, as well as information on funding for waste management projects, if applicable.

Alberta

(Biomedical Waste Management)
Environmental Health Services Branch
Alberta Health
Seventh Street Plaza
10030 - 107 Street
Edmonton, Alberta T5J 3E4
(403) 427-5868

(Waste Management:General Information)
Waste Management Branch
Alberta Environment
9820 - 106th Street
Edmonton, Alberta T5K 2J6
(403) 427 5838

British Columbia
Waste Management Branch
Municipal Solid and Biomedical Waste Branch
Environmental Protection Division
Parliament Buildings
Victoria, British Columbia V8v 1X5
(604) 387-9971

Manitoba
Department of Environment, Workplace Safety and Health
Environmental Management Division
Box 7, Building 2
139 Tuxedo Avenue
Winnipeg, Manitoba R3N 0H6
(204) 945-7100

New Brunswick
Department of the Environment
P.O. Box 6000
Fredericton, New Brunswick E3B 5H1
(506) 457-4848

Newfoundland and Labrador
Department of Environment and Lands
Environmental Investigation Division
Confederation Building
St. John's, Newfoundland A1B 4J6
(709) 576-2565

Northwest Territories
Pollution Control Division
Department of Renewable Resources
Yellowknife, N.W.T. X1A 2L9
(403) 873-7654

Nova Scotia
Department of the Environment
P.O. Box 2107
Halifax, Nova Scotia B3J 3B7
(902) 424-5300

Ontario
Waste Management Branch
Ontario Ministry of the Environment
2 St. Clair Avenue West, 14th Floor
Toronto, Ontario M4V 1L5
(416) 323-5200

Prince Edward Island
Department of the Environment
11 Kent Street
Charlottetown, P.E.I. C1A 7N8
(902) 368-5000

Quebec
Operations Regionales
Ministere de l'environnement
5199 rue Sherbrooke est
Montreal, Quebec H1T 3X9
(514) 873-3636

Saskatchewan
Lands Protection Branch
Saskatchewan Environment
3085 Albert Street
Regina, Saskatchewan S4S 0B1
(306) 787-5811

Yukon
Department of Community and Transportation Services
Government of Yukon
P.O. Box 2703
Whitehorse, Y.T. Y1A 2C6
(403) 667-3032

Federal
Waste Management Branch
Environment Canada
Place Vincent Massey
Boulevard St. Joseph
Hull, Quebec K1A 1C8
(819) 953-1119

WASTE EXCHANGES OPERATING IN NORTH AMERICA
(January, 1991)

Waste Exchanges can help you locate markets for materials. Contact the one closest to you.

Alberta Waste Materials Exchange
Mr. William C. Kay
Alberta Research Council
P.O. Box 8330, Postal Station F
Edmonton, Alberta T6H 5X2
(403) 450-5408
Fax: (403) 450-5477

British Columbia Waste Exchange
Mr. Tim Reeve,
102 - 1525 West 8th Avenue, Ste. 102,
Vancouver, B.C. V6J 1T5
(604) 731 7222

California Waste Exchange
Mr. Robert McCormick
Department of Health Services
Toxic Substances Control Division
Alternative Technology Section
P.O. Box 942732
Sacramento, CA 94234-7320
(916) 324-1807

Canadian Chemical Exchange
Mr. Philippe LaRoch
P.O. Box 1135
Ste-Adele, Quebec J0R 1L0
(514) 229-6511

Canadian Waste Materials Exchange
ORTECH International
Dr. Robert Laughlin
2395 Speakman Drive
Mississauga, Ontario L5K 1B3
(416) 822-4111, Ext. 265
Fax: (416) 823-1446

Enstar Corporation
Mr. J. T. Engster
P.O. Box 189
Latham, NY 12110
(518) 785-0470

Indiana Waste Exchange
Dr. Lynn A. Corson
Purdue University, School of Civil Engineering
Civil Engineering Building
West Lafayette, IN 47907
(317) 494-5036

Industrial Materials Exchange
Mr. Jerry Henderson
172 20th Avenue
Seattle, WA 98122
(106) 296-4633
Fax: (206) 296-0188

Industrial Materials Exchange Service
Ms. Diane Shockey
P.O. Box 19276
Springfield, IL 62794-9276
(217) 782-0450
Fax: (217) 524-4193

Industrial Waste Information Exchange
Mr. William E. Payne
New Jersey Chamber of Commerce
5 Commerce Street
Newark, NJ 07102
(201) 623-7070

Manitoba Waste Exchange
Dr. Beth Candlish
c/o Biomass Energy Institute Inc.
1329 Niakwa Road
Winnipeg, Manitoba R2J 3T4
(204) 257-3891

Montana Industrial Waste Exchange
Mr. Don Ingles
Montana Chamber of Commerce
P.O. Box 1730
Helena, MT 59624
(406) 442-2405

New Hampshire Waste Exchange
Mr. Gary J. Olson
c/o NHRRA
P.O. Box 721
Concord, NH 03301
(603) 224-6996

Northeast Industrial Waste Exchange Inc.
Mr. Lewis Cutler
90 Presidential Plaza, Suite 122
Syracuse, NY 13202
(315) 422-6572
Fax: (315) 422-9051

Ontario Waste Exchange
ORTECH International
Ms. Mary Jane Hanley
2395 Speakman Drive
Mississauga, Ontario L5K 1B3
(416) 822-4111
Fax: (416) 823-1446

Pacific Materials Exchange
Mr. Bob Smee
South 3707 Godfrey Blvd.
Spokane, WA 99204
(509) 623-4244

Peel Regional Waste Exchange
Ms. Lisa Morgan
Regional Municipality of Peel
10 Peel Centre Drive
Brampton, Ontario L6T 4B9
(416) 791-9400

RENEW
Ms. Hope Castillo
Texas Water Commission
P.O. Box 13087
Austin, TX 78711-3087
(512) 463-7773
Fax: (512) 463-8317

Resource Exchange & News
Ms. Kay Ostrowski
400 Ann Street, N.W., Ste. 201A
Grand Rapids, MI 49504-2054
(616) 363-3262

San Fransicso Waste Exchange
Ms. Portia Sinnott
2524 Benvenue, #35
Berkeley, CA 94704
(415) 548-6659

Saskatchewan Waste Exchange
Saskatchewan Research Council,
Mr. Eugene N. Ogu
515 Henderson Drive
Regina, Saskatchewan, S4N 3X1
(306) 787-9800

Southeast Waste Exchange
Ms. Maxie L. May
Urban Institute, UNCC Station
Charlotte, NC 128223
(704) 547-2307

Southern Waste Information Exchange
Mr. Eugene B. Jones
P.O. Box 960
Tallahassee, FL 32302
(800) 441-SWIX (7949)
(904) 644-5516
Fax: (904) 574-6704

Wastelink, Division of Tencon, Inc.
Ms. Mary E. Malotke
140 Wooster Pike
Milford, OH 45150
(513) 248-0012
Fax: (513) 248-1094

PROVINCIAL RECYCLING ORGANIZATION

These voluntary organizations provide information on various recycling initiatives in their province and some also produce newsletters.

Alberta:

Recycling Council of Alberta
P.O. Box 2100, Station M (#27)
Calgary, Alberta T2P 2M5

British Columbia:

Recycling Council of B.C.
102 - 1525 West 8th Avenue
Vancouver, B.C. V6J 1T5
(604) 731-7222
Fax: (604) 732-9253

Manitoba:

Recycling Council of Manitoba
412 McDermott Avenue
Winnipeg, Manitoba R3A 0A9
(204) 942-7781

Ontario:

Recycling Council of Ontario
P.O. Box 310, Station P
Toronto, Ontario M5S 2S8
(416) 960-1025, 960-0938
Toll Free: 1-800-263-2849

Quebec:

Fondo Quebecois de recuperation
407 blvd. St. Laurent, Ste 500
Montreal, Quebec H2Y 2Y5
(514) 874-3701

Saskatchewan:

Saskatchewan Environmental Society
P.O. Box 1372
Saskatoon, Saskatchewan S7K 3N9
(306) 665-1915 (Monday, Wed, Fri,9:30-2:30)

MUNICIPAL RECYCLING CONTACTS

Ontario:

Many municipalities in Ontario have hired recycling coordinators to help industry and institutions in their communities to find markets for potentially recyclable materials. In Ontario contact:

Association of Municipal
Recycling Coordinators
c/o ORTECH International
2395 Speakman Drive
Mississauga, Ontario L5K 1B3
(416) 822-4111

Contact your local municipal public works department to check if there is a recycling coordinator in your area.

Municipalities that currently offer Materials Recycling Directories for their areas are:

Essex Windsor Waste
Management Committee
360 Fairview Avenue
Essex, Ontario N8M 1Y6
(519) 776-6441

The Regional Municipality
of Hamilton Wentworth
Solid Waste Operations,
Dept. of Engineering
71 Main Street West
Hamilton, Ontario M5G 1Y8
(416) 546-2671

Metropolitan Works Dept.,
Refuse Disposal Division
439 University Avenue, 20th Floor
Toronto, Ontario M5G 1Y8
(416) 392-4200

Regional Municipality of Peel
Public Works Dept., Waste Reduction & Recovery
3190 Mavis Road
Mississauga, Ontario L5C 1T9
(416) 566-1511

Regional Municipality of Waterloo
Recycling Division
Marsland Centre, 20 Erb Street
Waterloo, Ontario N2J 4G7
(519) 747-5010

Other Contacts:

Hospitals can benefit by talking to each other. Hospital Networks for Environmental Issues may have already been formed in your area. If not, take the initiative and invite representatives from hospitals in your area to discuss their waste management strategies. In Ontario, the provincial network is:

Health Care Environment Network (HCEN)
c/o Public Affairs,
Sunnybrook Health Science Centre
2075 Bayview Avenue
Toronto, Ontario M4N 3M5
(416) 480-6100, ext. 4040
Fax: (416) 480-4588

SPECIFIC COMMERCIAL RECYCLING CONTACTS

Contact your provincial Waste Exchange, Recycling Council and/or Ministry of the Environment for help in locating markets, and for information on services and technologies for waste reduction, reuse or recycling. Some services may also be listed in the Yellow Pages in the Telephone Book.

The following list provides examples of contacts that are particularly relevant for hospitals.

Paper:

Paper Mills and brokers who purchase recycled paper.
e.g. Atlantic Packaging, Domtar, Quebec and Ontario Paper etc.

Food Waste:

(1) Reuse as Animal Feed:

Commercial: Contact local rendering companies or brokers listed in your Phone Book (e.g. Ontario Rendering Company,(Orenco))

Local Farmers: Contact local Agriculture Canada office to locate farmers who are certified to serve swill to their pigs

(2) Composting: Contact your Ministry of the Environment office, provincial recycling organizations, or:

Compost Council of Canada
55 Metcalf Street, Ste. 1300
Ottawa, Ontario K7O 6L5
(613) 238-4014
Fax: (613) 238-8642

Wood:

Pallets: Reuse
Ask suppliers to use only reusable pallets.
For further information , contact:

Canadian Wood Pallet and Container Association
P.O. Box 640
Pickering, Ontario L1V 3T3
(416) 831-3477

Unwanted medical equipment and supplies for supply to 3rd World Countries

Samaritans Purse,
Box 20100,Calgary Place
Calgary, Alberta T2P 4J2
(403) 250-6565
Fax: (403) 250-6567

Global Ed Med (GEMS)
77 Harbour Square,#3201
Toronto,Ontario.
M5J 2S2
(416) 533-3977
Fax (416) 533-9188

Liquid and Chemical Wastes

Anaesthetic Gases: For information on new initiatives in recycling anaesthetic gases contact:

Dusanka Filipovich, P.Eng.
123 Eglinton Avenue East
Toronto, Ontario M4P 1J3
(416) 488-1444, ext. 1443

Chlorofluorocarbons (CFCs):

Further information on issues and on-site recycling equipment can be obtained from:

Heating, Refrigeration and Air Conditioning
Institute of Canada (HRAI)
5468 Dundas Street West, Suite 308
Islington, Ontario M9B 6E3
(416) 239-8191
Fax: (416) 239-1983

Off-site Recycling: Contact your supplier

Solvents: Distill laboratory solvents with small on-site distillation units. Example of a supplier is:

Parkes Scientific Canada Inc.
76 Quesnell Road
Edmonton, Alberta T5R 5N2
(403) 484-1849
Fax: (403) 484-0601

Recycling: Commercial solvent recyclers may be interested in your solvents. Contact your provincial Ministry of the Environment, Waste Exchange, or hazardous waste hauler, to find recyclers nearest you

BIOMEDICAL WASTES

Placentae are collected for extraction of γ globulins. One company that picks up placentae from healthy births across Canada is:

Bockneck Ltd.
165 Bethridge Road
Rexdale, Ontario M9W 1N4
(416) 745-0796

Service provided: Includes pick-up placentae;
provide boxes and small freezer;
payment of 35¢/lb for placenta pick-up service

ENERGY AUDITS

Contact your local or provincial Hydro for information on how to be more energy efficient.

PURCHASING PRACTICES

For information on purchasing products recognized by Environment Canada as most environmentally appropriate in specific product categories (i.e with the ECOLOGO symbol) contact:

Environmental Choice Program,
107 Sparks St.,
Ottawa,Ontario
K1A OH3.